A DISSERTATION ON

# "A STUDY ON ROLE OF EXCISION BIOPSY IN CERVICAL LYMPHADENOPATHY PATIENTS IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL, CHENNAI"

Dissertation submitted to

**THE TAMIL NADU Dr.M.G.R.MEDICAL UNIVERISTY**

**CHENNAI**

with partial fulfilment of the regulations

for the Award of the degree

**M.S. (General Surgery)**

Branch –I


**INSTITUTE OF GENERAL SURGERY,**

**MADRAS MEDICAL COLLEGE,**

**CHENNAI**

**APRIL - 2017**

# CERTIFICATE

This is to certify that this dissertation titled **"A STUDY ON ROLE OF EXCISION BIOPSY IN CERVICAL LYMPHADENOPATHY PATIENTS IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL"** is the bonafide work done by **Dr.M.KARTHIK,** Post Graduate Student (2014 - 2017) in the Institute of General Surgery, Madras Medical College, Chennai, under the direct guidance and supervision, and in partial fulfillment of the regulations laid down by the Tamilnadu Dr.M.G.R.Medical university, Chennai for M.S Branch I, General Surgery degree examination.

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# DECLARATION

I, declare that this dissertation titled **"A STUDY ON ROLE OF EXCISION BIOPSY IN CERVICAL LYMPHADENOPATHY PATIENTS IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL, CHENNAI"** represents a genuine work of mine. The contributions of any supervisors to the research are consistent with normal supervisory practice, and are acknowledged.

I also affirm that this bonafide work or part of this work was not submitted by me or any others for any award , degree or diploma to any other University board , either in India or abroad. This is submitted to The Tamil Nadu Dr. M.G.R Medical University, Chennai in partial fulfillment of the rules and regulations for the award of Master of Surgery Degree Branch- I (General Surgery).

Date:

Place: **Dr.M.KARTHIK**

**INSTITUTIONAL ETHICS COMMITTEE**
**MADRAS MEDICAL COLLEGE, CHENNAI 600 003**

EC Reg.No.ECR/270/Inst./TN/2013
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**CERTIFICATE OF APPROVAL**

To
Dr.M.Karthik
Post Graduate in M.S. (General Surgery)
Madras Medical College
Chennai 600 003

Dear Dr.M.Karthik,

The Institutional Ethics Committee has considered your request and approved your study titled **"A STUDY ON THE ROLE OF EXCISION BIOPSY IN CERVICAL LYMPHADENOPATHY PATIENTS IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL, CHENNAI" - NO.(II) 20032016.**

The following members of Ethics Committee were present in the meeting hold on **22.03.2016** conducted at Madras Medical College, Chennai 3

| | |
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| 1.Dr.C.Rajendran, MD., | :Chairperson |
| 2.Dr.R.Vimala,MD.,Dean,MMC,Ch-3 | :Deputy Chairperson |
| 3.Prof.Sudha Seshayyan,MD., Vice Principal,MMC,Ch-3 | : Member Secretary |
| 4.Prof.P.Raghumani,MS, Dept.of Surgery,RGGGH,Ch-3 | : Member |
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| 9.Thiru S.Govindasamy, BA.,BL,High Court,Chennai | : Lawyer |
| 10.Tmt.Arnold Saulina, MA.,MSW., | :Social Scientist |

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

Member Secretary - Ethics Committee

MADRAS MEDICAL COLLEGE
31 MAR 2016

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
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CHENNAI-600 003

A STUDY ON ROLE OF EXCISION BIOPSY IN CERVICAL

LYMPHADENOPATHY PATIENTS IN RGGGH

M.S. DEGREE EXAMINATION

BRANCH I - GENERAL SURGERY

INSTITUTE OF GENERAL SURGERY, RGGGH,

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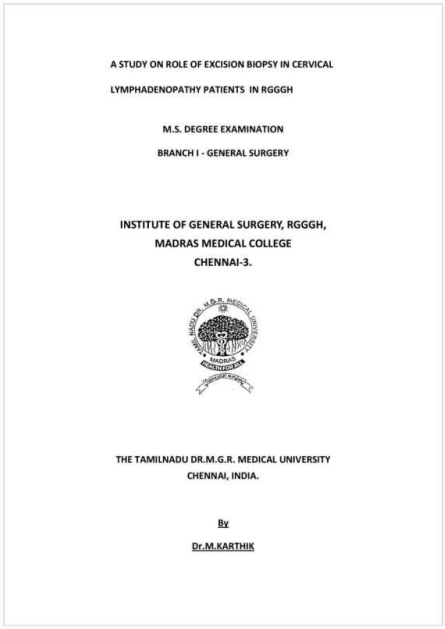

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By

Dr.M.KARTHIK

## ACKNOWLEDGEMENT

First and foremost, my gratitude to my esteemed teacher and guide, **Prof Dr.A.RAJENDRAN M.S** whose guidance and encouragement I will never forget. His precious advice, keen interest and suggestions from his vast experience have made this work possible. Words can hardly express my deep sense of gratitude, reverence and thankfulness for his invaluable guidance and inspiration, without which this work would not have been accomplished. I convey my special thanks to **Dr. MANIVANNAN, Dr. VISWAK CHANDAR** and **Dr. M. SENTHILKUMAR, Dr. KUDIARASU, Dr.PRABAKAR** their encouragement, valuable guidance and moral support throughout the course of this study.

I am thankful to all my senior teachers and my colleagues and our staff members for their valuable guidance and for helping me at various stages in completing the present study.

I wish to thank my parents**, Mr.P.MANI and Dr. M.TAMILARASI** They have loved me, taught me, and natured me. To them I dedicate this work.

Last but not the least, I am also grateful to all the patients included in the present study, for their participation and cooperation without which my study would not have been possible. At the end, I thank all those who have been unwillingly overlooked by me, but without whose help this work would not have been possible.

**Dr.M.KARTHIK**

# ABBREVATIONS

| | | |
|---|---|---|
| **TB** | **-** | **TUBERCULOSIS** |
| **P** | **-** | **PLASMACYTOTMA** |
| **DLBCL** | **-** | **DIFFUSE LARGE B CELL LYMPHOMA** |
| **S** | **-** | **SECONDARIES** |
| **HL** | **-** | **HODGKINS LYMPHOMA** |
| **BL** | **-** | **BURKITTS LYMPHOMA** |
| **CLN** | **-** | **CERVICAL LYMPH NODE** |
| **SCLN** | **-** | **SUPRACLAVICULAR LYMPH NODE** |

# CONTENTS

# INTRODUCTION

# INTRODUCTION

The neck is the part of the trunk that joins the head and the chest and constitutes its most mobile part. It is essentially cylindrical in shape; length is constant while diameter varies. The expression “long neck/short neck” is incorrect, because the length of the neck, understood to be the cervical portion of the vertebral column, does not present significant variations. Conversely, neck width, determined by the development of muscular and adipose masses is extremely variable.

**Significant anatomical structures**: superficial, middle, and deep cervical fasciae; lymph nodes.

**Landmarks:** mandible, external auditory canal, mastoid, clavicle, jugulum. Its upper limits run along the inferior and posterior borders of the mandible, the extreme posterior of the zygomatic arches, the anteroinferior borders of the external auditory canals, the profiles of the mastoid apophyses, the superior nuchal line, and the external occipital protuberance. Its lower boundaries liealong the superior border of the sternum and clavicles, the acromioclavicular joints, and an imaginary line joining the acromioclavicular joints to the spinous process f the seventh cervical vertebra.

# AIMS AND OBJECTIVES

# AIMS AND OBJECTIVES

## DETAILS OF THE PROJECT SUBMITTED FOR CLEARANCE FROM INSTITUTIONAL ETHICS COMMITTEE

## [SYNOPSIS]

| | |
|---|---|
| Title | **"A STUDY ON THE ROLE OF EXCISION BIOPSY IN CERVCALLYMPHADENOPATHYPATIENTS IN RAJIV GANDHI GENERAL HOSPITAL, CHENNAI"** |
| Aims and Objectives | 1.To study the role of excision biopsy in arriving at a histopathological diagnosis<br>2. To compare the role of FNAC and excision biopsy in solving the diagnostic dilemma<br>3. To follow the outcome of patients arrived at a histopathological diagnosis |
| Study Centre | Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai |
| Duration of Study | Oct 2015 to Sep 2016 |
| Study Design | Observational study (Prospective and Retrospective) |
| Sample Size | Approximately 50 |
| Inclusion Criteria | All patients presenting with cervical lymphadenopathy with or without other group of lymph nodes in the body |

| | |
|---|---|
| Exclusion Criteria | All paediatric patients(< 13 years of age)<br>All oral malignancy patients with associated cervical lymphadenopathy |
| Ethics Clearance | Applied |
| Methodology | All Patients who fit the inclusion criteria will be observed and following data collected<br>1.Details of the patient like<br>• age<br>• duration of the swelling<br>• contact history with tuberculosis patients<br>• associated complaints<br>2. Routine blood investigations<br>-Hemoglobin<br>- Hematocrit<br>-Total count and differential count<br>- Peripheral smear<br>- Total and direct bilirubin<br>- Blood urea and serum creatinine<br>- LDH<br>3. High frequency ultrasound of the neck<br>4. FNAC of the swelling<br>5. Chest x ray, CECT neck in selective cases<br>6. Mantoux test and sputum AFB<br>6. Excision biopsy in case of diagnostic dilemma<br>7.Post operative biopsy report<br>8. The final treatment plan and the follow up of the patients till discharge or during their future visit to RGGGH |

| | |
|---|---|
| | All collected data will be analysed and conclusions derived |
| Sponsorship (Yes/ No) If Yes details | No |
| Conflict of Interest | No |

# REVIEW OF LITERATURE

# REVIEW OF LITERATURE

1. Patients are subjected to a variety of investigations like USG, FNAC, Chest Xray, Mantoux test. Most of the times the results of these give inconclusive diagnosis making a delay in the appropriate treatment.
2. Patients are subjected to excision biopsy and finally we arrive at a diagnosis which is very helpful.By tissue diagnosis we can make gene Xpert studies for Tuberculosis patients,IHC markers for lymhomas and so on.
3. Hence the need for this study is to prove the role of excision biopsy in cervical lymphadenopathy patients as superior to FNAC in selected cases.

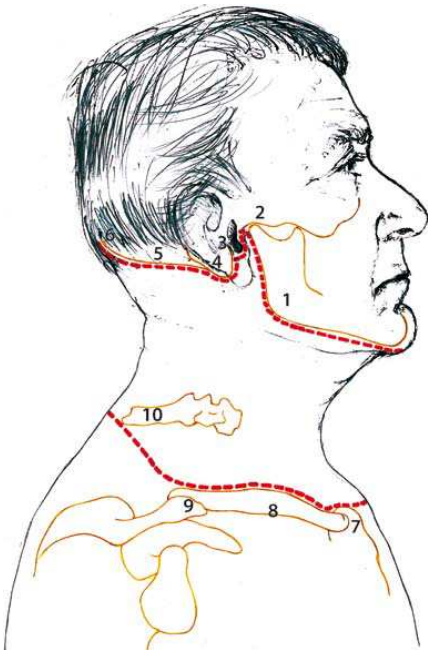
The neck is the part of the trunk that joins the head and the chest and constitutes its most mobile part. It is essentially cylindrical in shape; length is constant while diameter varies. The expression“long neck/short neck” is incorrect, because the length of the neck, understood to be the cervical portion of the vertebral column, does not present significant variations. Conversely, neck width, determined by the development of muscular and adipose masses is extremely variable.

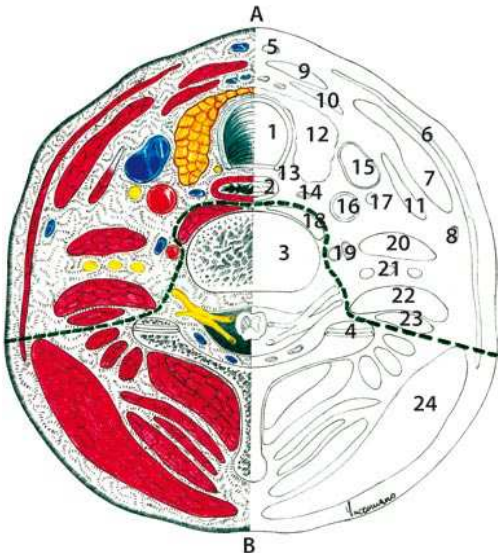
**Significant anatomical structures**:

superficial, middle, and deep cervical fasciae; lymph nodes.

**Landmarks:**

Mandible, external auditory canal,mastoid, clavicle, jugulum. Its upper limits run along the inferior and posterior borders of the mandible, the extreme posterior of the zygomatic arches, the anteroinferior borders of the external auditory canals, the profiles of the mastoid apophyses, the superior nuchal line, and the external occipital protuberance. Its lower boundaries liealong the superior border of the sternum and clavicles, the acromioclavicular joints, and an imaginary line joining the acromioclavicular joints to the spinous process of the seventh cervical vertebra.




Neck boundaries

1 = mandible

2 = zygomatic process of the temporal bone

3 = external auditory canal

4 = mastoid

5 = superior nuchal line

6 = external occipital protuberance

7 = manubrium sterni

8 = clavicle

9 = acromioclavicular joint

10 = spinous process of seventh cervical vertebra

On transverse section, the neck appears to be roughly divided into two parts, a posterior or nuchal (osteo–muscular) part and anterior or tracheal (muscular–fascial) part. The conventional dividing line extends fromthe transverse vertebral processes to the anterioredges of the trapezius muscles .

Transverse cervical section: tracheal region ■

and nuchal region. **A** Tracheal region **B** Nuchal region

1 = trachea

2 = esophagus

3 = vertebral body of seventh cervical vertebra

4 = interapophyseal articulation

5 = anterior jugular vein

6 = platysma muscle

7 = sternocleidomastoid muscle

8 = external jugular vein

9 = sternohyoid muscle

10 = sternothyroid muscle

11 = omohyoid muscle

12 = thyroid gland

13 = recurrent nerve

14 = inferior thyroid vein

15 = internal jugular vein

16 = common carotid artery

17 = vagus nerve

18 = prevertebral muscles

19 = vertebral artery and vein

20 = anterior scalene muscle

21 = brachial plexus

22 = medial scalene muscle

23 = posterior scalene muscle

24 = trapezius muscle

The function of the posterior region is essentially static and dynamic–powerful, articulatedmuscles support a bone framework withthe head at the top. This structure functionsas an articulated joint since the two interapophysealjoints between one vertebra andthe next permit head movement; it also functionsas a shock absorber for intravertebral disk compressibility in addition to being a fastening point for the muscles of mastication, swallowing, and speech. The cervical portion of the vertebralcolumn is curved with anterior convexity (cervical lordosis). In contrast, the anterior region, which is the object of this dissection, holds the internal organs. It contains the parotid and submandibular glands,

the thyroid gland, several lymph nodes, and is crossed by important blood and lymphatic vessels, nerves, and by the respiratory and digestive tracts.

In addition to being prevalently a structureof transit and union, the neck is an important point of autonomous physiological activity, linked to the presence of exocrine glands (parotid and submandibular), endocrine glands (thyroid, parathyroid, and thymus), muscle and tendon neuroreceptors, visceral receptors, vascular chemopressoreceptors, and lymph nodes.

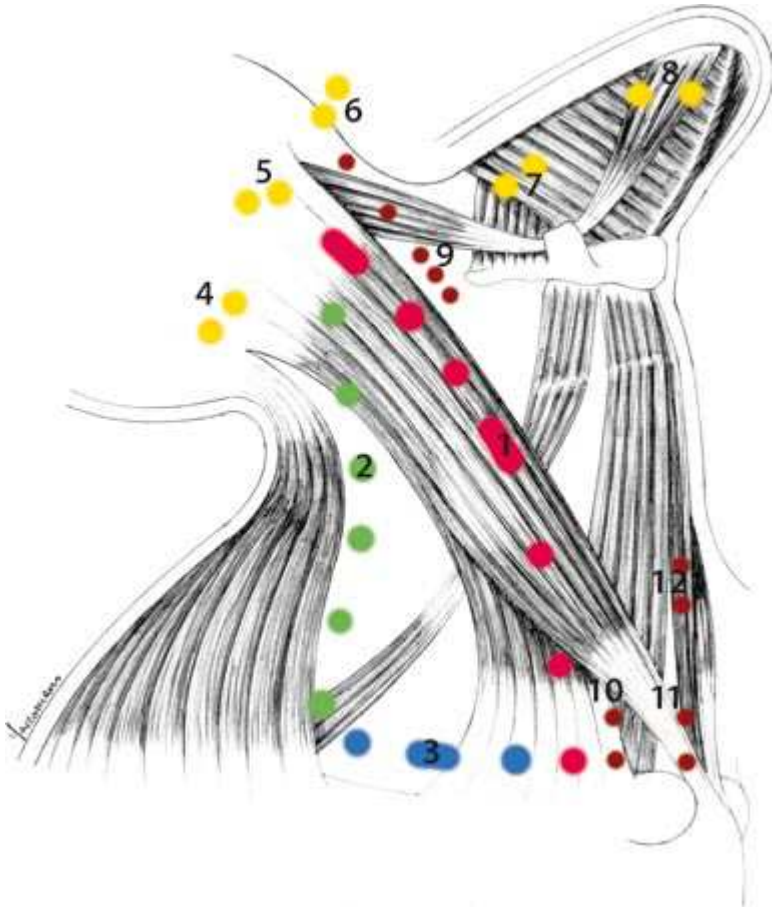
Almost all cervical viscera originate from or lead to the thorax or upper extremities; the loose connective tissue surrounding them is in direct, continuous contact with the loose connective tissue of the mediastinum and axillary regions. In some points, the loose connective tissue thickens to form fibrous sheaths (around neurovascular bundles, the laryngotracheal canal, and the thyroid) and perimuscular aponeuroses.

These latter define importantdissection planes, particularly:

1. The superficial cervical fascia (*fascia colli*), extending from the anterior edge of the trapezius and splenus capitis muscles on both sides, which divides into two to enclose the sternocleidomastoid muscles, parotid gland and submandibular gland; it fuses with the middle cervical fascia on the midline.

2. The middle cervical fascia, lying between the omohyoid muscles on both sides; as a whole, it forms a triangle with the hyoid bone at its apex and the clavicles at thebase; it divides in two to contain the infrahyoid muscles.
3. The deep (or prevertebral) cervical fascia,investing the prevertebral muscles and dividing laterally to contain the scalene and levator scapulae muscles.

The cervical lymphatic system forms a three-dimensional network into whose nodal points the lymph nodes are intercalated. Although they vary in number and dimensions, they do keep a relatively constant position, and they can thus be considered topographicallygrouped into lymph gland stations




Lymph node stations

1 = jugular chain

2 = spinal chain

3 = supraclavicular chain

4 = occipital lymph nodes

5 = mastoid lymph nodes

6 = parotid lymph nodes

7 = submandibular lymph nodes

8 = submental lymph nodes

9 = retropharyngeal lymph nodes

10 = recurrent lymph nodes

11 = pretracheal lymph nodes

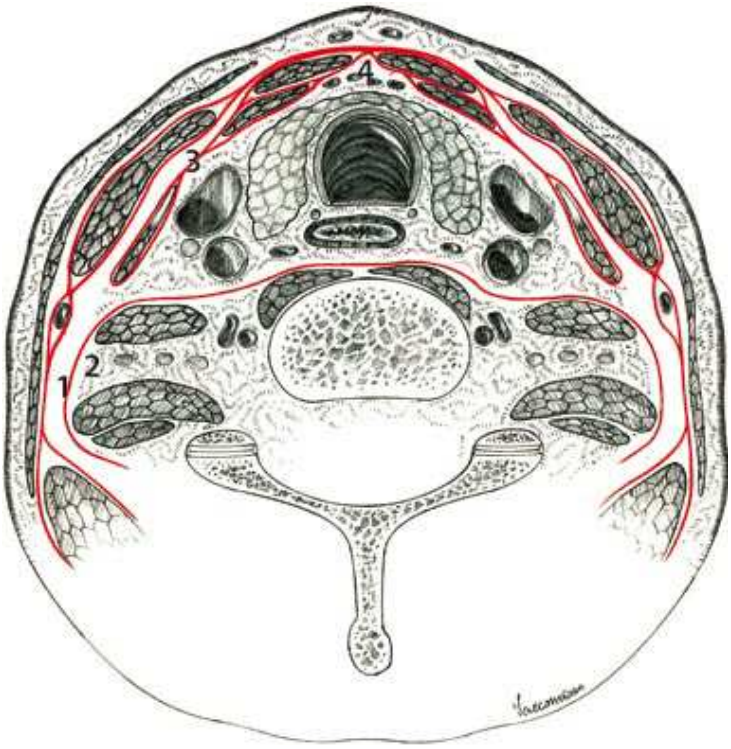
12 = prethyroidean lymph node

**These are divided in the neck as follows:**

1. A superficial, subfascial lymph node system with a circular arrangement between chin and occiput (occipital, mastoid, parotid,submandibular, and submental lymph nodes) and along the course of the external jugular vein.

2. A deep, more consistent lymph node system in a bilateral triangular arrangement, bounded anteriorly by lymph nodes adjacent to the internal jugular vein, and posteriorly by the spinal lymph node chain, with a supraclavicular lymph node.

3. A perivisceral lymph node system close to the median viscera (prethyroidean, pretracheal, retropharyngeal, recurrent and finally prelaryngeal lymph nodes, the more defined of which, called “delficus”, is situated betweenthe cricothyroideal muscles).




Transverse cervical section: cervical fasciae

1 = superficial cervical fascia

2 = deep cervical fascia

3 = middle cervical fascia

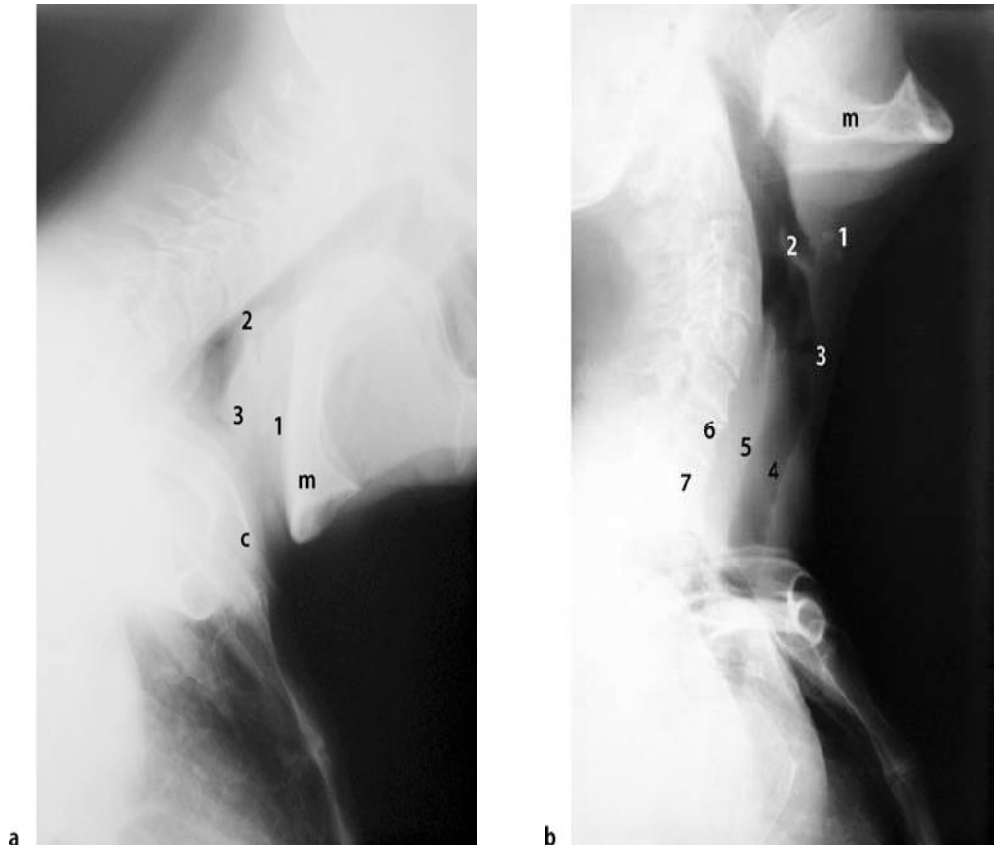
4 = white infrahyoid line

**Anatomists divide the neck into two major regions:**

1. The anterior region, situated between the two sternocleidomastoid muscles, encompassing the suprahyoid, infrahyoid, and prevertebral regions.
2. The lateral regions, comprising the parotid,sternocleidomastoid or carotid, and supraclavicular regions.

For the sake of simplicity and for dissection purposes, we instead divide the neck into three lateral regions (parotid, submandibular, and laterocervical) and three median regions (inferior median, superior median, and prevertebral).

The anatomic arrangement of the neck organs varies considerably with neck movements, especially flexing–extending movements.




For example, at maximum flexion, thehyoid bone, one of the more cranial structures,

m=mandible

c = clavicle

1 = hyoid bone

2 = epiglottis

3 = laryngeal ventricle

4 = trachea

5 = cervical esophagus

6 = seventh cervical vertebra

7 = first thoracic vertebra

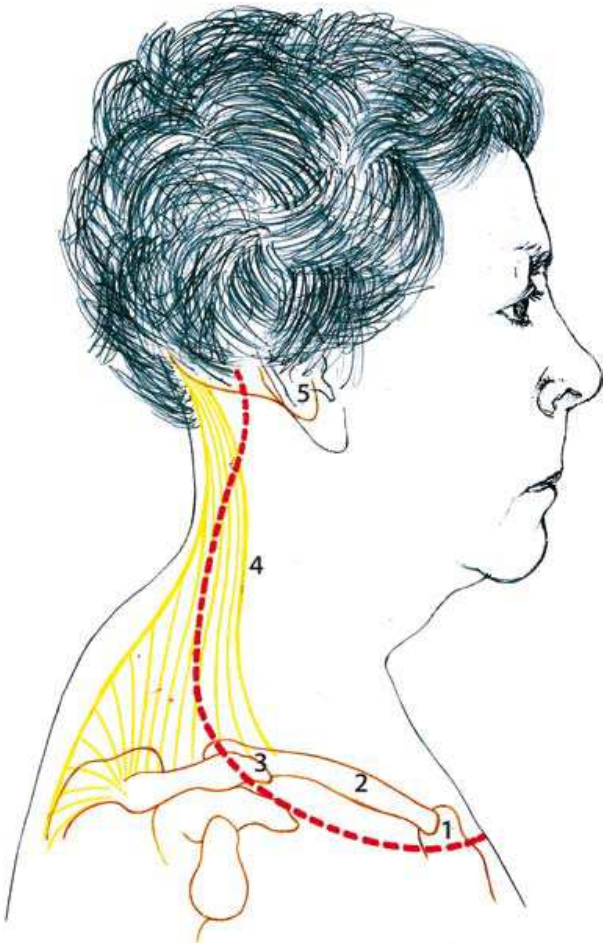
Neck mobility. a Flexion, b extension can almost reach the thorax (Fig. 2.5a, b). Surgeons should bear this in mind since they can take advantage of great cervical mobility to achievethe widest possible dissection areas.

## SUPERFICIAL DISSECTION

The neck is placed in a normal position, hyper extended.

The incision is very low and posterior, to allow reconstitution of the cadaver at the end of dissection without scars that disfigure the uncovered cutaneous areas.

Our references are the mastoid and the inferior margin of the mandible superiorly, the clavicles, and the sternal manubrium inferiorly.




Cutaneous line of incision

1 = manubrium sterni

2 = clavicle

3 = acromioclavicular joint

4 = anterior margin of trapezius muscle

**Significant anatomical structures:**

Superficial cervical fascia, platysma, sternocleidomastoid muscle, digastric muscle.

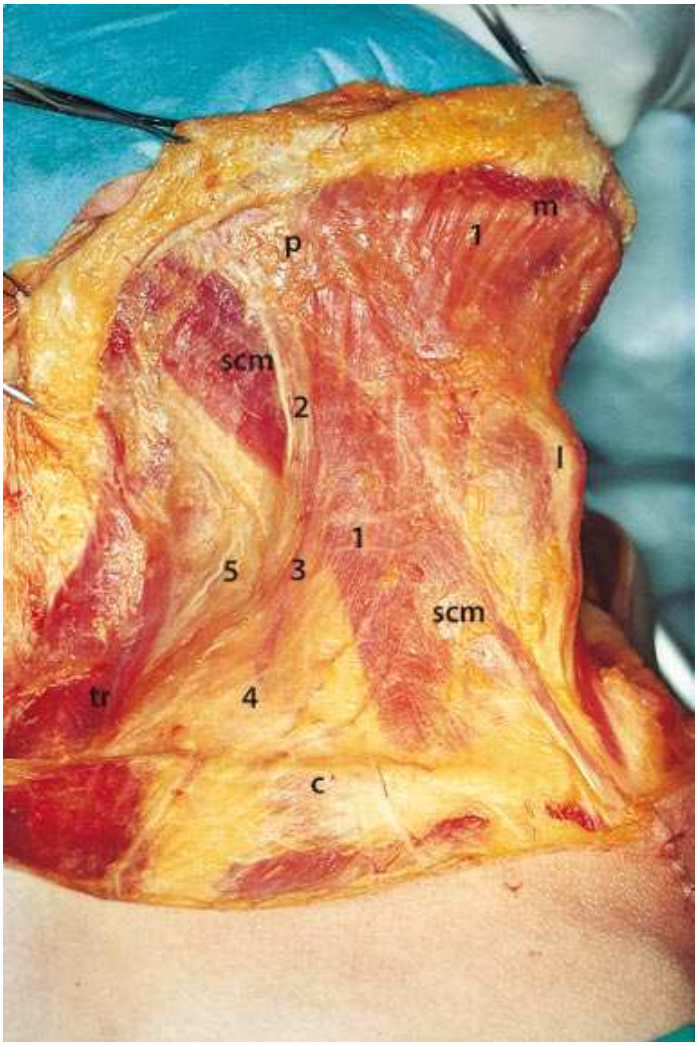
**Landmarks:**

jugulum, clavicle, anterior margin of the trapezius, mastoid, mental protuberance, laryngeal protuberance (Adam’s apple), cricoid cartilage.

A large cutaneous flap is raised, with an incision approximately 3 cm beneath the inferior margin of the clavicle, extending along the acromioclavicular joint, and ascending laterally by approximately 3 cm behind the trapezius margin and posterosuperiorly to the posterior profile of the mastoid apophysis,beyond the level of the external auditory canal

The flap may be raised above the platysma,which thus becomes fully exposed.

The platysma muscle extends from the corpus mandibulae to the outer surface of the clavicle. Its lateral margin crosses the sternocleidomastoid muscle between its third medianand third superior, and then descends toward the acromioclavicular joint; from the mental symphysis, its medial margin deviates from the midline in an inferior direction; its outer surface is more or less rectangular and invested with subcutaneous tissue and its inner surface is contiguous with the superficial cervical fascia. The platysma is innervated by a branch of the facial nerve




**Platysma muscle plane**

m = mandible

p = parotid

scm = sternocleidomastoid muscle

tr = trapezius muscle

c = clavicle

l = larynx

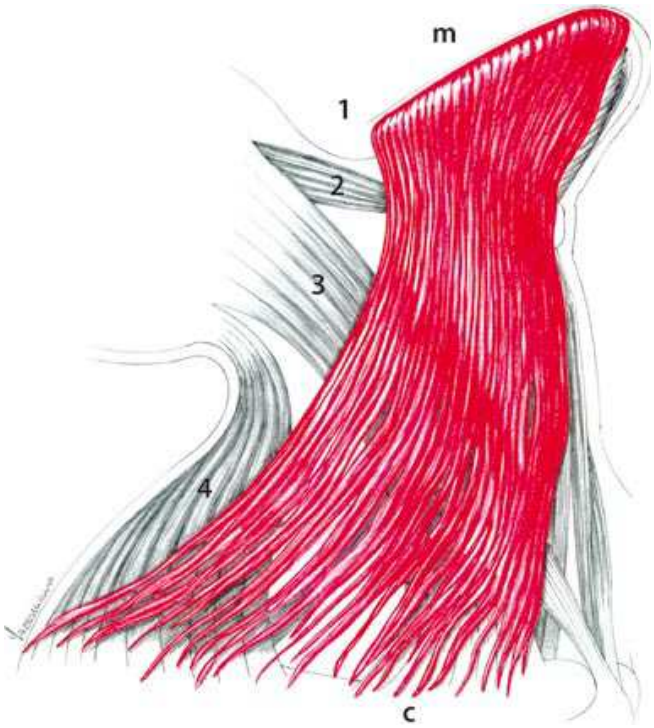
1 = platysma muscle

2 = great auricular nerve

3 = external jugular vein

4 = superficial cervical fascia

5 = spinal accessory nerve (peripheral branch)




platysma muscle

m = mandible

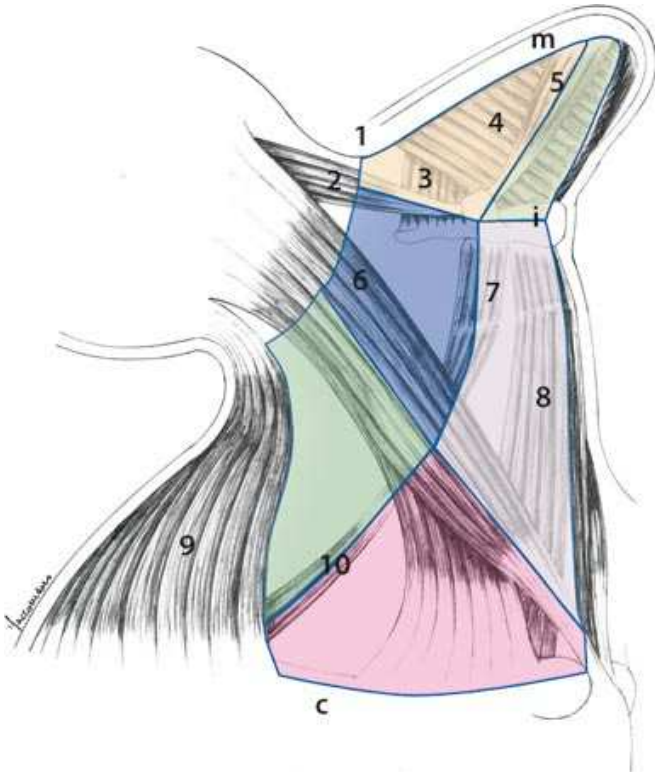
c = clavicle

1 = angle of mandible

2 = posterior belly of digastric muscle

3 = sternocleidomastoid muscle

4 = trapezius muscle




superficial surgical triangles

m = mandible

c = clavicle

i = hyoid bone

1 = angle of mandible

2 = posterior belly of digastric muscle

3 = hyoglossus muscle

4 = mylohyoid muscle

5 = anterior belly of digastric muscle

6 = sternocleidomastoid muscle

7 = superior belly of omohyoid muscle

8 = sternohyoid muscle

9 = trapezius muscle

10 = inferior belly of omohyoid muscle

**The *anterior triangle* is bounded by the**

sternocleidomastoid muscle, the inferior margin of the mandible, and the midline. It is further divided into:

1. The submental triangle, lying between the anterior belly of the digastric muscle, the corpus ossis hyoidei, and the midline.

2. The digastric triangle, lying between the two bellies of the digastric muscle, and the inferior margin of the mandible.

3. The muscular triangle, lying between the sternocleidomastoid muscle, the superior belly of the omohyoid muscle, and the midline.

4. The carotid triangle, lying between the sternocleidomastoid muscle, the posterior belly of the digastric muscle, and the superior belly of the omohyoid muscle.

**The *posterior triangle* is bounded by the**

sternocleidomastoid muscle, trapezius, and clavicle. It is further divided into:

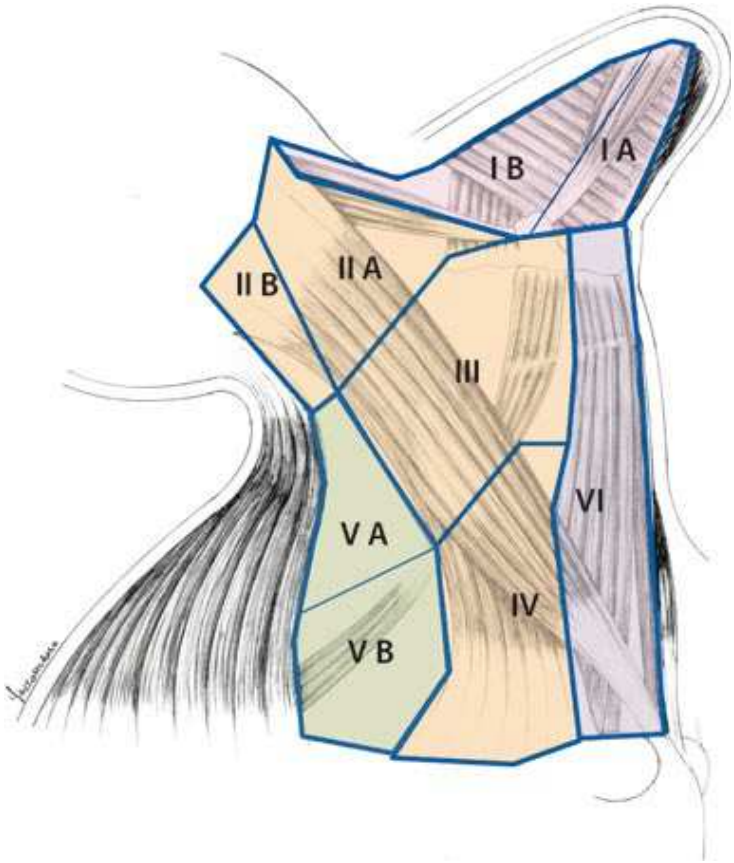
1. The spinal triangle, lying between the sternocleidomastoid muscle, the trapezius, andthe inferior belly of the omohyoid muscle.

2. The supraclavicular triangle, lying betweenthe sternocleidomastoid muscle, the inferiorbelly of the omohyoid muscle, and the clavicle.

The above topographic division of the neck is the one used by anatomists and is certainly a helpful method of orienting general anatomy.

In routine oncological practice, importance is laid on an additional, internationally accepted topographical subdivision, introduced by K. Thomas Robbins in 1991 ; it was updated by him in 2002 , and is now internationally accepted.

**Cervical levels according to Robbins (2002)**




Its aim is to achieve uniformity in the nomenclature of various types of cervical lymph node neck dissection,which it does by classifying the various topographicalregions involved in the excision and any sacrificed anatomic structures. The neckis therefore divided into a total of 6 six levels(five on each side plus a sixth anterior median level)

**Remarks:** The concept of neck dissection as an indispensable complement to the treatment of tumors of the upper aero digestive tract began with George Crile more than a century ago. Neck dissection was always carried out with the demolitive technique. In the 1960s, Ettore

Bocca introduced the so-called functional neck dissection in Europe . It is based on OsvaldoSuarez's assertion that there are no lymph node formations outside the fascial investments of the neck

So, the surgeon can be just as radicalas in the neck dissection proposed by Crile while preserving important structures such asthe sternocleidomastoid muscle, the internaljugular vein, and the spinal accessory nerve. This applies as long as the lymph node capsule is intact. This new method has led to an appreciablereduction of morbidity.

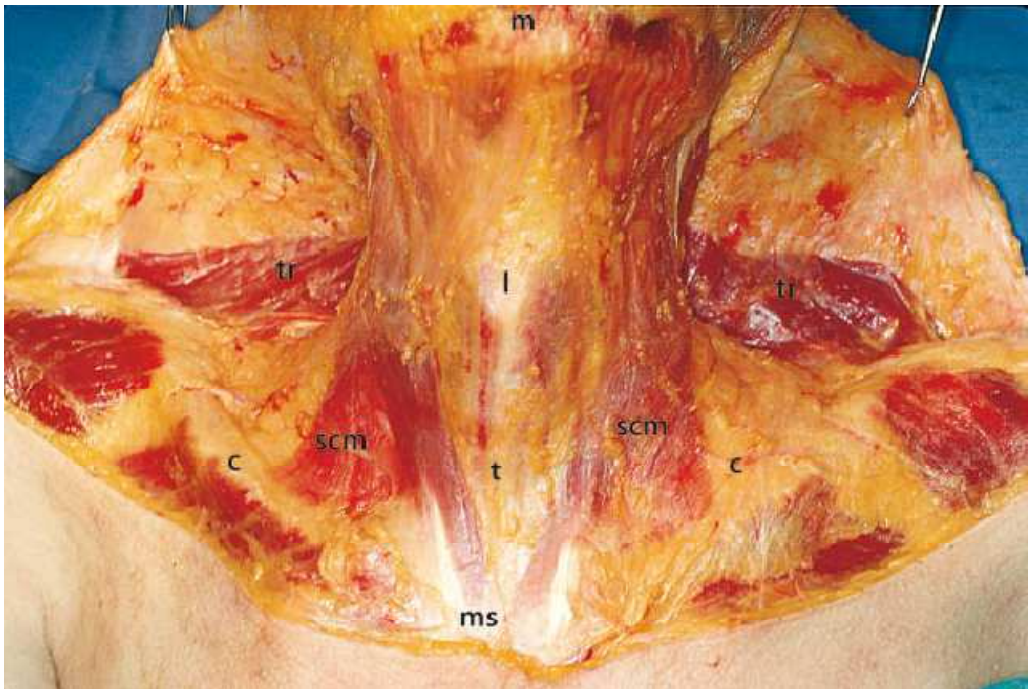
In recent years the study of the pattern of metastatic diffusion of tumors of the head and neck has led surgeons performing prophylactic neck dissection (that is, in N0 necks), to neglect the lymphatic areas that are statistically less exposed to metastatic colonization.

Selective neck dissections were therefore introduced in routine surgery. The reason behind this evolution is to reduce as far as possible the functional sequelae of cervical neck dissections.

At the end of this surgical phase, the vast dissection field extends inferiorly from the trapezius muscles to the clavicles and superiorly to encompass the mandible and external auditory canal

We now try to establish the limits of the Robbins levels conceptually and by palpation. At the top we identify the mastoid and the hyoid bone; farther down, the inferior margin of the cricoid and then the

sternal manubrium and the clavicle; and posteriorly, the anteriormargin of the trapezius.




Cutaneous flap

m = mandible

l = larynx

t = thyroid gland

ms = manubrium sterni

c = clavicle

scm = sternocleidomastoidmuscle

tr = trapezius muscle

**Submandibular submental region Robbins level 1**

The region we are going to dissect corresponds to Robbins level I. Sublevel IA coincides with the submental region, and sublevel IB coincides with the submandibular level. The two sublevels are separated by the anterior belly of the digastric muscle.

The almond-shaped submandibular gland is located in the cavity of the same name and invested by a layer of superficial cervical fascia. The cavity has a superomedial wall contiguous with the mylohyoid and a lateral wall contiguous with the body of the mandible. The inferolateral wall is invested with split-open superficial cervical fascia, subcutaneous tissue, and skin. The anterior end of the gland is inserted between the mylohyoid and hyoglossal muscles and communicates with the sublingual cavity. The posterior end of the gland is separated from the parotid by the interglandular septum, which marks a thickening in the superficial cervical fascia, and is in close contact with the origin of the facial artery.

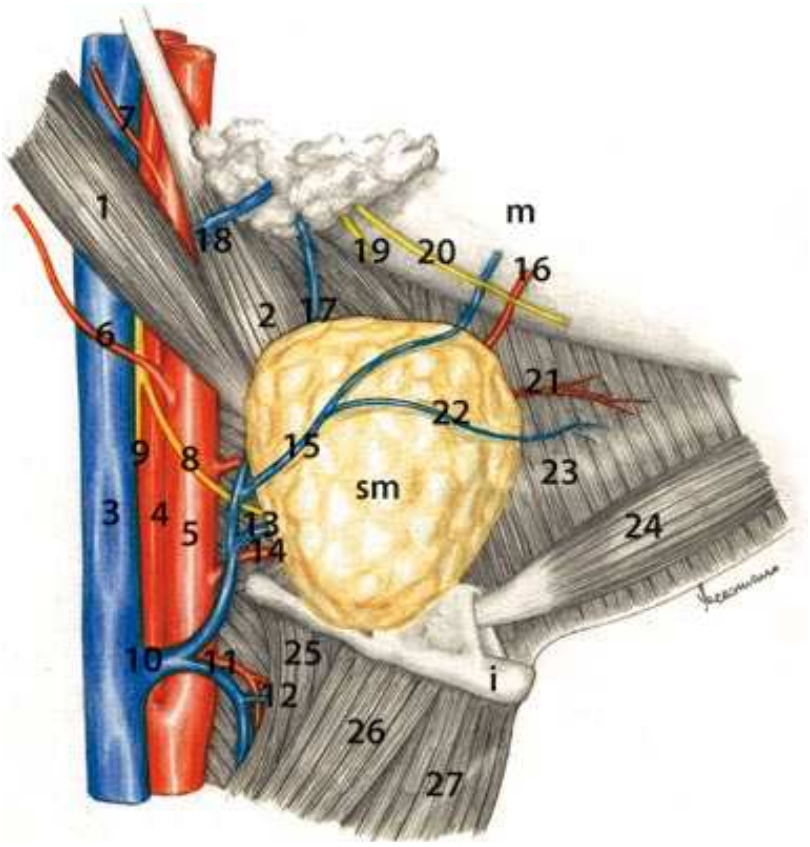
The submandibular lymph nodes are prevalently subfascial and are situated by the superolateral margin of the gland. The submandibular cavity is bounded caudally by the digastric muscle. The anterior belly bounds the submental region with its median line (Fig. 5.1).

Significant anatomical structures: marginal branch of the facial nerve, facial artery, submental artery, lingual artery, lingual nerve, Wharton’s duct, hypoglossal nerve.

**Landmarks**:

angle of the mandible, mental protuberance, hyoid bone, posterior margin of the mylohyoid muscle.

**5.2 Dissection**




Ablation of the submandibular gland (I)

sm = submandibular gland

p = parotid

m = mandible

i = hyoid bone

1 = posterior belly of digastric muscle

2 = stylohyoid muscle

3 = internal jugular vein

4 = external carotid artery

5 = internal carotid artery

6 = occipital artery

7 = posterior auricular artery

8 = hypoglossal nerve

9 = descending branch of hypoglossal nerve

10 = thyrolinguofacial venous trunk

11 = superior thyroid artery and vein

12 = superior laryngeal artery and vein

13 = lingual vein

14 = lingual artery

15 = facial vein

16 = facial artery

17 = retromandibular vein

18 = external jugular vein

19 = platysma branch (facial nerve)

20 = marginal branch (facial nerve)

21 = submental artery

22 = submental vein

23 = mylohyoid muscle

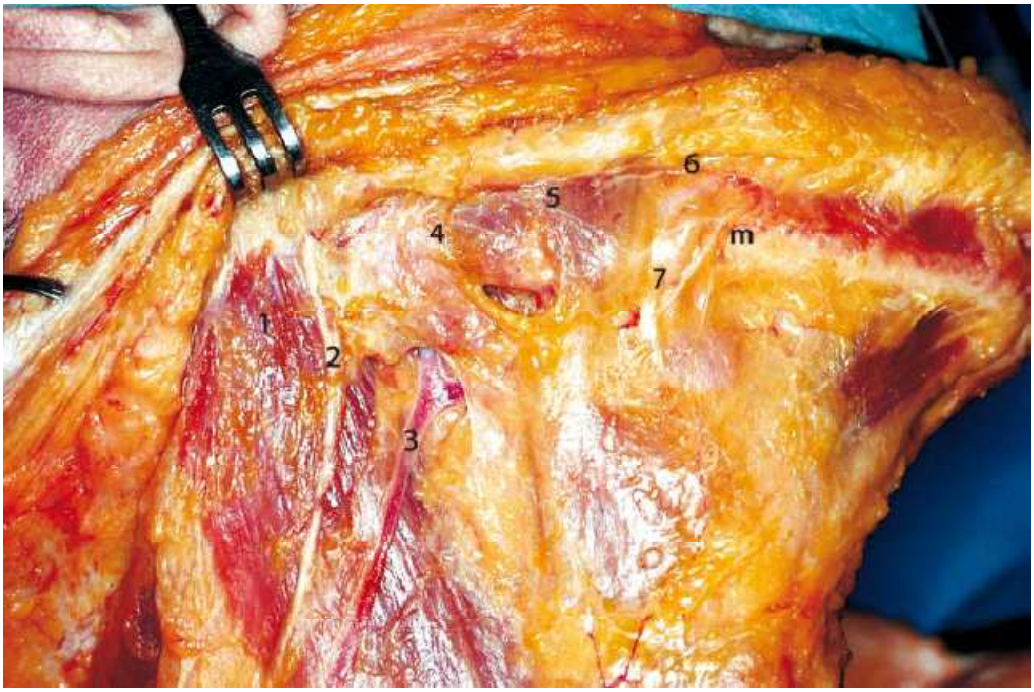
24 = anterior belly of digastric muscle

25 = thyrohyoid muscle

26 = omohyoid muscle

27 = sternohyoid muscle

## Fascial plane




M=mandible

1 = sternocleidomastoid muscle

2 = great auricular nerve

3 = external jugular vein

4 = angle of mandible

5 = masseter muscle

6 = marginal branch (facial nerve)

7 = facial pedicle

Below the platysma, the region is invested with superficial cervical fascia, which divides into two at this level to envelop the gland. In the thickness of the fascia we can identify two of the inferior branches of the

facial nerve, i.e., the marginal nerve and nerve serving the platysma muscle. The former runs1 cm above the inferior margin of the corpus mandibulae; the latter, which is more difficult to find, runs through the posterosuperior angle of the region, descending to innervate the platysma

After dissecting the superficial cervical fascia, the submandibular gland is exposed.

On the surface of its posterior pole we look for the facial nerve, which in its downward course unites anteriorly with the submental vein and posteriorly with the retromandibular vein (or external carotid vein) to form the facial venous trunk. It should be borne in mind that venous circulation in this region is somewhat variable, and the situation described is the most frequent one. The interglandularseptum can be viewed further behind, which is a thickening of the superficial cervical fascia separating the submandibular gland from theparotid .

Dissection then proceeds by elevating the superficial cervical fascia from the contents of the cavity, exposing at the top the distal part of the facial pedicle. At the bottom the two bellies are uncovered and the intermediate tendon of the digastric muscle that binds the submandibular cavity at the bottom.

The facial pedicle can be found straddlingthe inferior margin of the mandible, by the anterior border of the masseter muscle.

The marginal branch of the facial nerve crosses the facial pedicle at the top and innervates the mimetic muscles of the lower lip. We ligate the distal facial pedicle 1 to 2 cm from the inferior margin of the mandible.

**Complications:**

Traumatization of the marginal nerve causes temporary paresis of the de-pressor labii inferioris. It is therefore good practice to maintain a caudal position with respect to the cutaneous incision, to avoid exerting excessive traction on the flap in proximity to the mandibular margin and, where necessary, to dissect the facial pedicle as close as possible to the gland. In the latter case we are sure to preserve it by turning the sectioned pedicle upward.

The nerve, which always passes over the pedicle, is thus stretched upward, away from the surgical field (Hayes Martin maneuver). Gland ablation begins from the posterior pole, demonstrating the course of the facial artery branch of the external carotid artery. It emerges behind the posterior belly of the digastric muscle, posteriorly skimming the submandibular gland; running backwardand forward, and upward and downward, it surfaces to surround the inferior margin of the mandible,

immediately anterior to the facial vein. We ligate the proximal facial pedicle where it appears behind the digastric muscle.

In the benign pathology of the submandibulargland, the facial artery is preserved as a rule

Its anterior branch, the submental artery,thrusts itself in an anteromedial direction, toward the submental region, and is the only important vessel above the mylohyoid muscle. Once we arrive at this plane, we reveal the posterior margin of the muscle (Fig. 5.7).

The gland is then raised from the deep muscle plane (hyoglossus muscle) and intermediate muscle plane (mylohyoid muscle) and everted. The submental artery is dissected together with the previously isolated venous collectors of the facial trunk

The exposure of the plane of the hyoglossus allows above all the identification of the hypoglossal nerve, which runs anteriorly beneath the mylohyoid muscle and above the intermediate tendon of the digastric muscle.

Above the nerve we shall isolate Wharton’s duct.

A small Farabeuf is used to move the posterior margin of the mylohyoid muscle forward, revealing the hyoglossal plane.

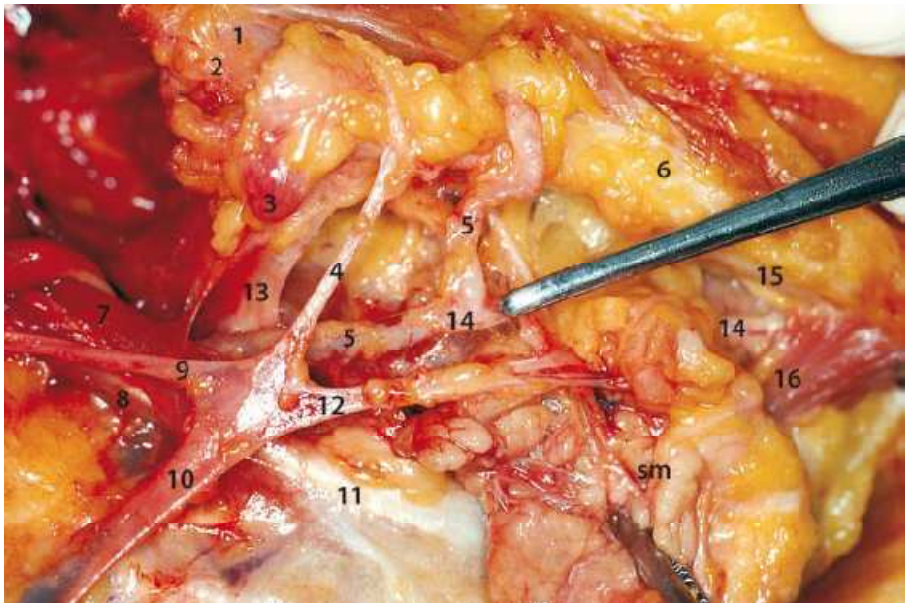
The following can be seen from the top downward:

1. The lingual nerve (a sensory nerve arising in the posterior trunk of the mandibular branch of the trigeminal nerve; it provides sensory and taste innervation of the mucosa in front of the lingual “V”) connected to the submandibular ganglion (parasympathetic, with afferent impulses from the chorda tympani of the facial nerve, and efferent impulses to the lingual nerve with a submandibular and sublingual secretory function).
2. Wharton’s duct, oriented anteriorly toward the sublingual gland.
3. The hypoglossal nerve (motor nerve of the tongue and—in concert with the descending branch of the cervical plexus—the subhyoid muscles, save the thyrohyoid muscle, which it innervates separately) .

**Complications:**

On reaching the hyoglossal muscle plane, it is essential when ligating Wharton’s duct to avoid injuring the lingual nerve or, worse still, the hypoglossal nerve,as by rash cautery. Lesion of the hypoglossal nerve causes dysphagia and the tongue, when protruded, deviates toward the paretic side.

# FACIAL ARTERY




sm = submandibular gland

1 = angle of mandible

2 = proximal portion of marginal branch (facial nerve)

3 = lymph node

4 = facial vein

5 = facial artery

6 = distal portion of marginal branch (facial nerve)

7 = stylohyoid muscle

8 = posterior belly of digastric muscle

9 = retromandibular vein

10 = facial venous trunk

11 = intermediate tendon of digastric muscle

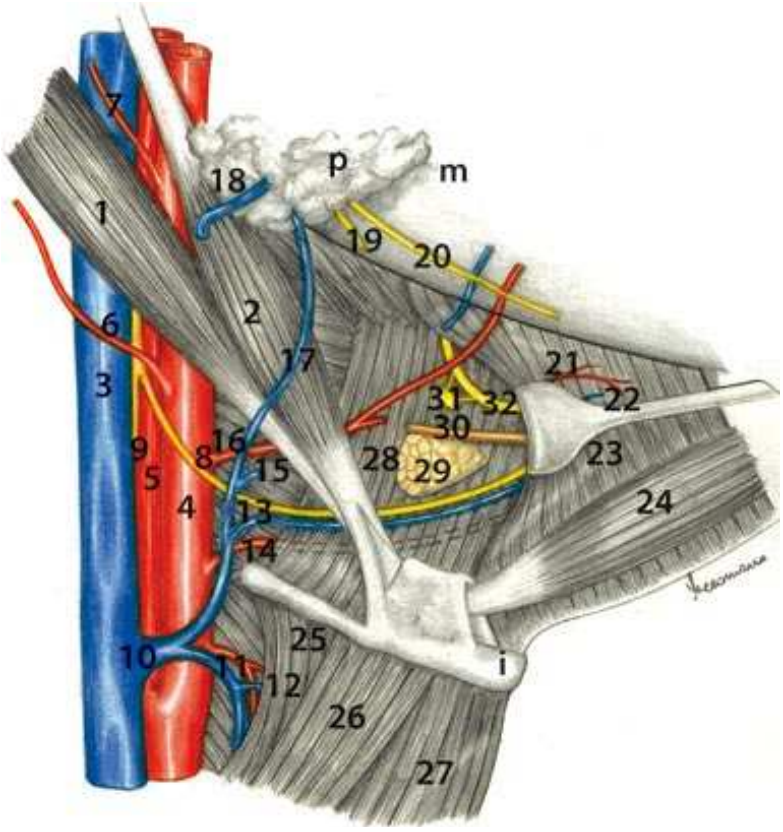
12 = submental vein

13 = interglandular septum

14 = origin of submental artery

15 = mandibular inferior margin

16 = anterior belly of digastric muscle




5Core Message

Ablation of the submandibular gland (III)

p = parotid

m = mandible

i = hyoid bone

1 = posterior belly of digastric muscle

2 = stylohyoid muscle

3 = internal jugular vein

4 = external carotid artery

5 = internal carotid artery

6 = occipital artery

7 = posterior auricular artery

8 = hypoglossal nerve

9 = descending branch of hypoglossal nerve

10 = thyrolinguofacial venous trunk

11 = superior thyroid artery and vein

12 = superior laryngeal artery and vein

13 = lingual vein

14 = lingual artery

15 = facial vein

16 = facial artery

17 = retromandibular vein

18 = external jugular vein

19 = platysma branch (facial nerve)

20 = marginal branch (facial nerve)

21 = submental artery

22 = submental vein

23 = mylohyoid muscle

24 = anterior belly of digastric muscle

25 = thyrohyoid muscle

26 = omohyoid muscle

27 = sternohyoid muscle

28 = hyoglossus muscle

29 = anterior process of submandibular gland

30 = Wharton’s duct

31 = submandibular ganglion

32 = lingual nerve

## LATEROCERVICAL REGION(STERNOCLEIDOMASTOID OR CAROTID REGION –ROBBINS LEVELSII, III, and IV. )

Anatomists corresponds approximately to Robbin levels II, III, and IV. It comprises roughly the sternocleidomastoid muscle and all that lies below it, considering the head in a normal position.\Robbins's classification (2002) gives its precise limits, which are the base of the skull and the stylohyoid muscle at the top, the clavicle at thebottom, the posterior margin of the sternocleidomastoid muscle at the side, and, anteriorly, the lateral edge of the sternocleidomastoid muscle.

The three levels are divided in the craniocaudal direction by the inferior edge of the hyoid bone and the inferior edge of the cricoid cartilage. The significant lymph node groups are above all those of level II and III, which represent the principal stations of lymphatic drainage of the neck.

**Significant anatomical structures:**

common trunk of the spinal accessory nerve, cervical plexus, carotid arteries, internal jugular vein, vagus nerve, hypoglossal nerve, thyrolinguofacial trunk, phrenic nerve, subclavian artery, thoracicduct.

**Landmarks:**

transverse process of the atlas, stylohyoid muscle, omohyoid muscle, greater cornu of the hyoid bone, carotid tubercle.

**Dissection**

We begin the dissection of this region from the most cranial part. We identify the deep musculofascial plane, which is formed, lateromedially, by the splenius capitis, levator scapulae, and scalene muscles.

After having applied traction medially on the sternocleidomastoid muscle with a Farabeuf, we seek by palpation the transverse process of the atlas, which is an important landmark and the upperlimit of lymph node drainage of the neck; close by runs the occipital artery or some of its branches. The overlying loose cellular connective tissue is stretched medially and the lesser occipital nerve, a cutaneous branch of the cervical plexus, can be demonstrated in the deep muscle plane .

It is important at this point to find the common trunk of the spinal accessory nerve, which runs anteriorly to the internal jugular vein in a mediolateral direction and penetrates the sternocleidomastoid muscle.

A reliable method of identifying it amid the cellulo–adipose tissue is to grasp the muscle with the hand, after isolating it from bottom to top, and to palpate with the index finger the stretched nerve within this soft

tissue setting Instead, the most practical method is direct access from level II. The anterior margin ofthe sternocleidomastoid muscle and the posterior belly of the digastric muscle are freed;the latter is another important landmark, on the surface of which there are no dangerous structures for dissection. Divaricating these two muscles allows access to Robbins level lII. The common trunk of the spinal accessory nerve, which normally (though not always) runs above the internal jugular vein, divides into an anterior sector (level IIA) and a posteriorone (level IIB) (Fig. 7.3).

**Remarks:**

In tumors of the larynx, the presence of metastases at level IIB when level IIA is intact is a negligible occurrence. So, once the intraoperative histological examinationhas ascertained that level IIA is free from metastases, level IIB is not removed.

**Exercise 5: Robbins Level IIB**

It may be interesting to proceed with the surgical technique of approach to level IIB as used in modified radical and selective dissections.

Once the common trunk of the spinal accessory nerve has been identified and thesternocleidomastoid and digastric muscles have been well divaricated, we first identify the internal jugular vein, which must be

left medially. The nerve is delicately raised and separated from the adipose tissue below. We dissect the adipose tissue along an arched line with upper convexity, until we reach the deep muscle plane (levator scapulae and splenius capitis muscles). The upper limit of the dissection is the transverse process of the atlas, which is always easy to identify by palpation.

In this area, we may encounter the occipital artery or one of its collateral branches. The adipose tissue is then elevated from the muscular plane from top to bottom and passedbelow the spinal nerve as a “bridge”.

The inferior insertions of the sternocleidomastoid muscle are now dissected, that is:

1. The head of the clavicle, corresponding to the deepest muscular portion, more wide and thin, which inserts on the medial quarter of the clavicle.
2. The sternal head, corresponding to the most superficial and most consistent portion, which inserts on the anterior face of the sterna manubrium with a conoid tendon.

The two components of the sternocleidomastoid muscle have different functions. The contraction of the head of the clavicle induces the flexion of the head onto the clavicle; the contraction of the sternal head induces the rotation and the contralateral extension of the head. The two

muscle heads mark off a small triangular space with the base at the bottom (fossa supraclavicularis minor), which corresponds in depth to a length of the common carotid artery.

The sternocleidomastoid muscle is dissected and everted up to the exit point of the spinal accessory nerve and the omohyoid muscle is entirely isolated

The dissection from the deep plane and the lateromedial shifting of the loose and fascial cellular tissues isolated so far allows the cervical plexus to be revealed.

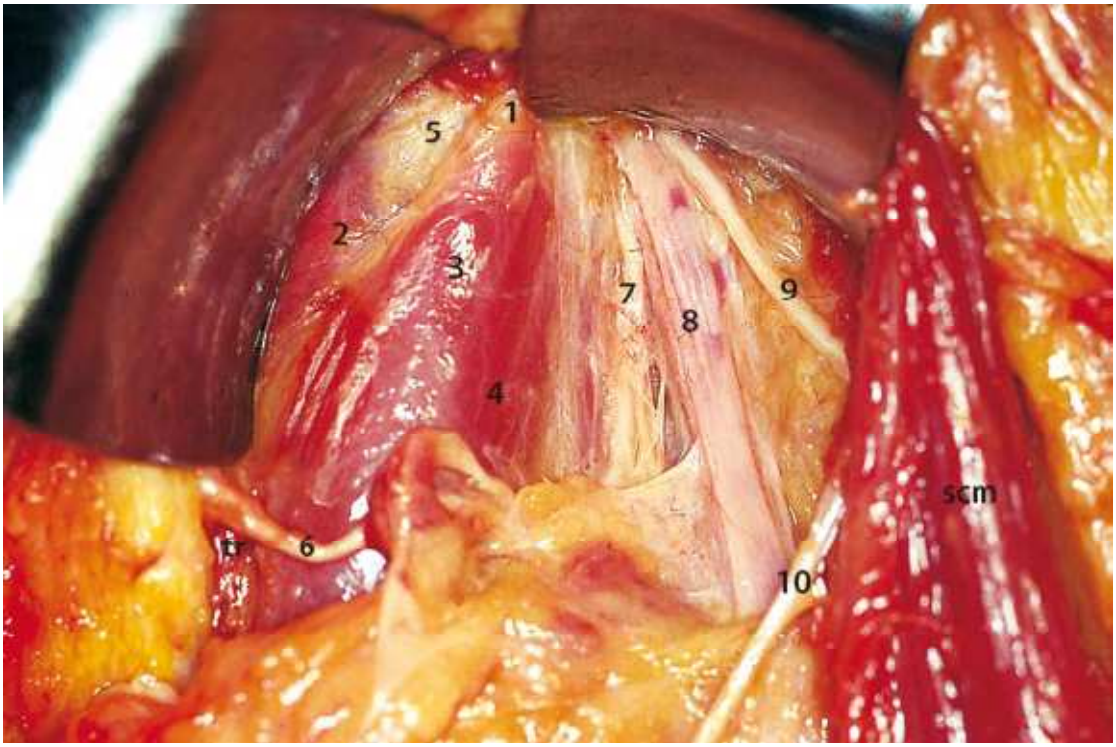
Dissection proceeds by isolating, again from top to bottom and back to front, the external carotid artery and, one by one, its anterior collateral branches:

1. The superior thyroid artery, which arises immediately after the carotid artery, describes a descending curve of about 100°, and medially branches into the superior laryngeal artery. The latter artery, accompanied by thehomonymous vein and superior laryngealnerve together form the superior laryngeal pedicle.
2. The lingual artery, situated above the superior laryngeal nerve is accompanied by the homonymous vein and runs superomedially, embedding itself just above the apex of the greater cornu of the hyoid bone and passing inferiorly to the posterior border of the hyoglossal muscle. Although parallel to the lingual artery, the

lingual vein takes a more superficial course, running anteriorly to the hyoglossal muscle. It thus accompanies the hypoglossal nerve in the direction of the submandibular region.

3. The facial artery, which, in close proximity to its origin, runs behind the posterior belly of the digastric muscle and heads toward the submandibular region.
4. The posterior collateral branches of the external carotid artery are also sought and their course followed:

a. The ascending pharyngeal artery, arising just above the origin of the superior thyroid artery; it rests on the middle constrictor of the pharynx and reascends.




**Cervical deep plane**

scm = sternocleidomastoid muscle

tr = trapezius muscle

1 = transverse process of atlas

2 = splenius capitis muscle

3 = levator scapulae muscle

4 = medial scalene muscle

5 = occipital artery

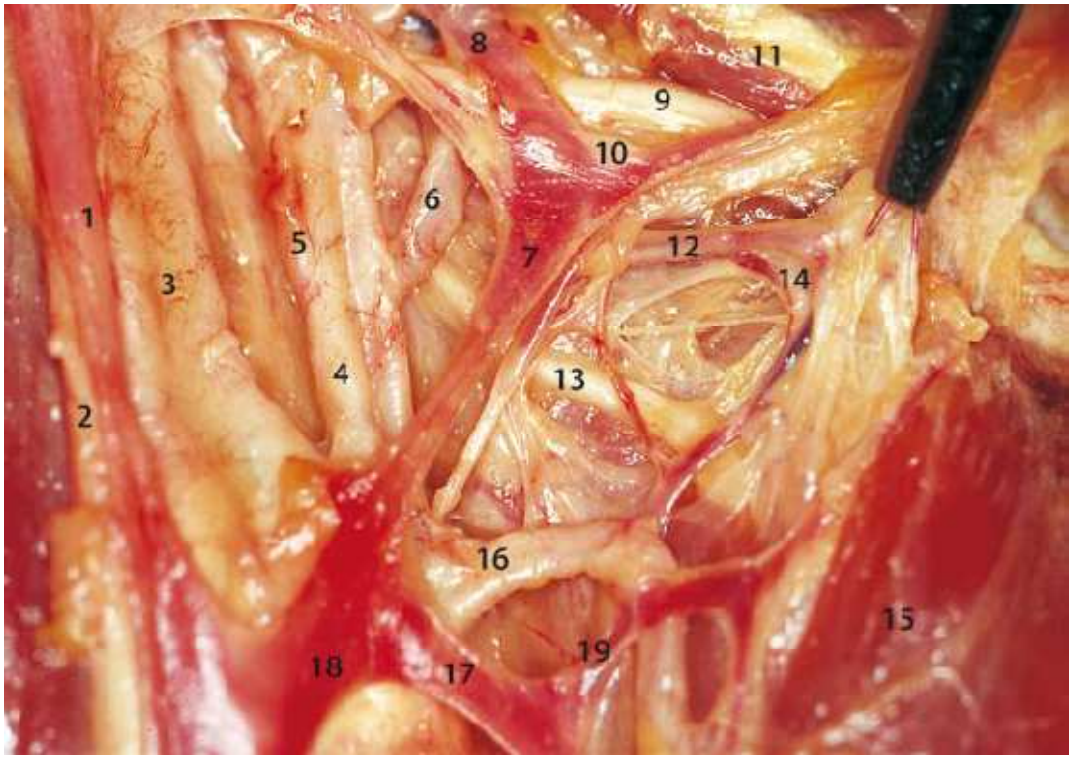
6 = lesser occipital nerve

7 = cervical plexus

8 = internal giugular vein

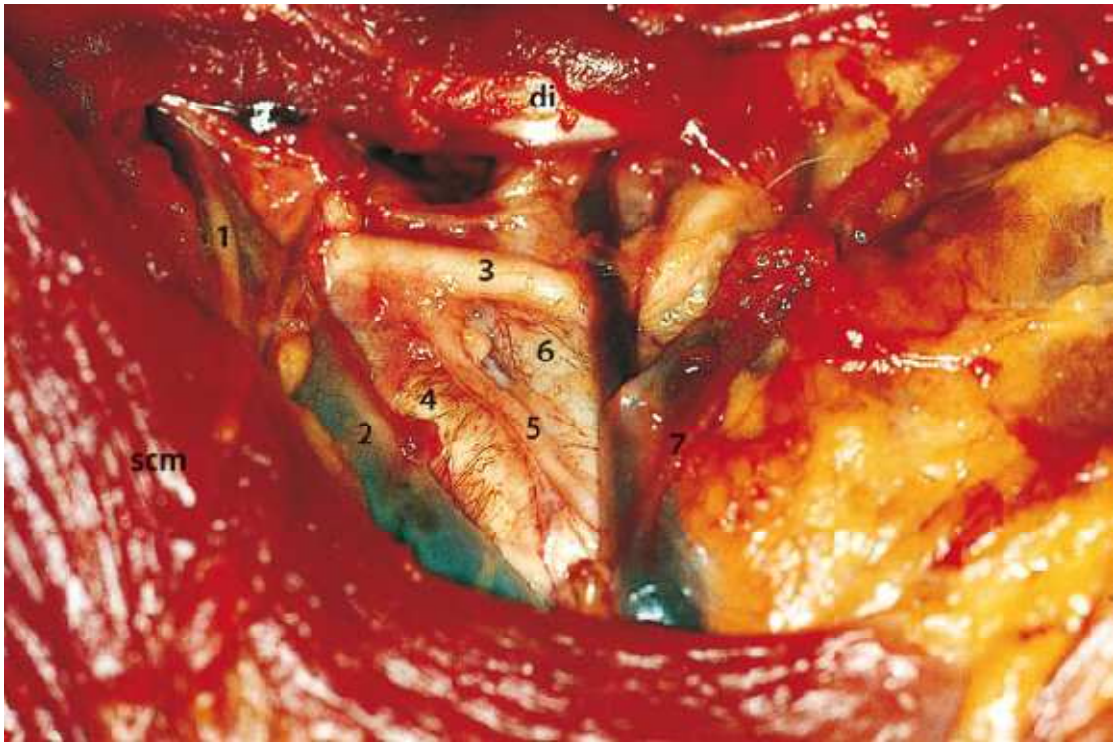
9 = spinal accessory nerve (common trunk)

10 = spinal accessory nerve (peripheral branch)




**Carotid bifurcation**

1 = internal jugular vein
2 = vagus nerve
3 = internal carotid artery
4 = external carotid artery
5 = ascending pharyngeal artery
6 = lingual artery
7 = common facial trunk
8 = retromandibular vein
9 = hypoglossal nerve
10 = facial vein
11 = hypoglossal muscle
12 = lingual vein
13 = superior laryngeal nerve
14 = greater cornu of hyoid bone
15 = sternohyoid muscle
16 = superior thyroid artery
17 = superior thyroid vein
18 = thyrolinguofacial trunk
19 = superior laryngeal vein




**Farabeuf ’s triangle**

scm = sternocleidomastoid muscle

di = digastric muscle

1 = spinal accessory nerve

2 = internal jugular vein

3 = hypoglossal nerve

4 = internal carotid artery

5 = descending branch of hypoglossal nerve

6 = external carotid artery

7 = thyrolinguofacial trunk

**Complications:**

Lymphorrhage may be favored by anatomic anomalies (high outlet of the thoracic duct, up to 5 cm from the clavicle) or by surgical maneuvers on metastases at level IV.

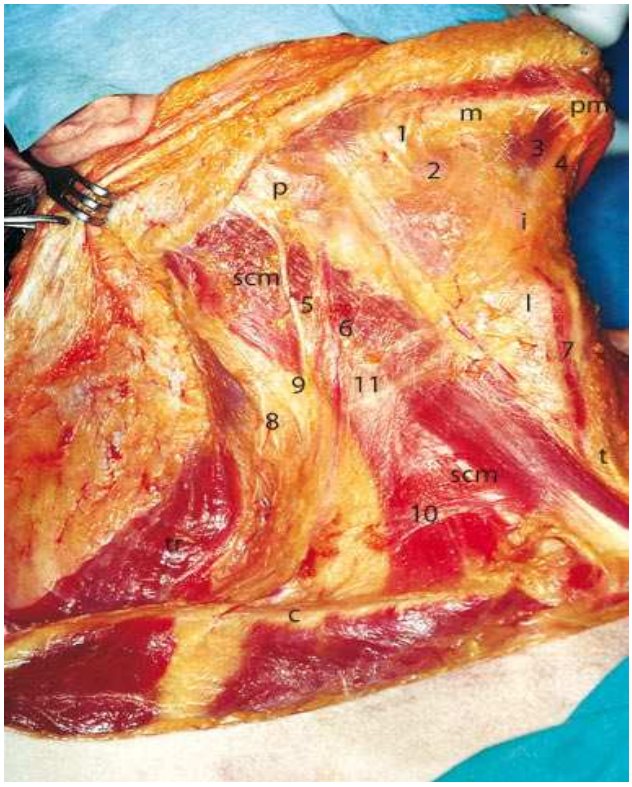
Usually it is autolimited with compressive medications and gravity drainage. If it exceeds 600 ml per day and persists for more than a week, surgical revision is indicated to avoid general complications, and granulations and scars in the surgical bed of neck dissection. The latter occurrence would pose problems for subsequent re-exploration

Laterocervical Region(Supraclavicular Region – Robbins Level V)

The laterocervical region is bounded posteriorlyby the anterior margin of the trapezius and by the splenius capitis muscle, anteriorly by the lesser cornu of the hyoid bone and lateral margins of the sternothyroid and thyrohyoid muscles, inferiorly by the superior margin of the clavicle, and superiorly by the inferior margin of the digastric muscle.

The deep boundary of the region corresponds to the scalene, levator scapulae, and prevertebral muscle plane .

Dissecting from bottom to top and from rear to front, we will adhere closely to the correct technique used for neck dissection in oncological patients, performing it here at least theoretically, to avoid the spread of any metastatic emboli.




**Laterocervical region**

p = parotid
m = mandible
pm = mental protrusion
scm = sternocleidomastoid muscle
i = hyoid bone
l = larynx
tr = trapezius muscle
t = thyroid gland
c = clavicle
1 = facial pedicle
2 = submandibular gland
3 = anterior belly of digastric muscle
4 = interdigastric (submental) area
5 = great auricular nerve
6 = external jugular vein
7 = anterior jugular vein
8 = spinal accessory nerve (peripheral branch)
9 = Erb's point
10 = superficial cervical fascia
11 = cutaneous cervical nerve

We shall start from the supraclavicular region and then move on to the jugulocarotid region.

Translating the anatomic nomenclature of the Robbins levels, our dissection will start with level V and then proceed, in the following chapter, with levels II, III, and IV.

The supraclavicular region corresponds to Robbins level V. It is bounded superiorly by the apex formed by the convergence of the trapezius and sternocleidomastoid muscles, inferiorly by the clavicle, anteriorly by the posterior margin of the sternocleidomastoid muscle, and posteriorly by the anterior margin of the trapezius.

This level has the shape of a pyramid with the base at the bottom, where the first rib separates it from the pulmonary apex. In depth, the emerging of the cervical and brachial plexi separates level V from levels II, III, and IV.

An imaginary horizontal line, inferiorly at a tangent to the cricoid cartilage, divides level V into VA (upper, lymph nodes of the spinal chain) and VB (lower, supraclavicular lymph nodes).

The celluloadipose content of this region is superiorly and medially in continuity with that of the jugulocarotid region, inferiorly and medially with that of the superior mediastinum, and inferiorly and laterally with that of the axilla.

The significant groups of lymph nodes are those adjacent to the peripheral portion of the spinal accessory nerve and those of the transverse cervical artery.

**Significant anatomical structures:**

External jugular vein, spinal accessory nerve, great auricular nerve, middle cervical fascia, brachial plexus, scalene muscles, phrenic nerve, transverse cervical artery, subclavian artery.

**Landmarks:**

clavicle, Erb's point, anterior margin of the trapezius, omohyoid muscle, Lisfranc's tubercle.


**Superficial cervical fascia plane**

1 = great auricular nerve

2 = external jugular vein

3 = cutaneous cervical nerve

4 = superficial cervical fasci

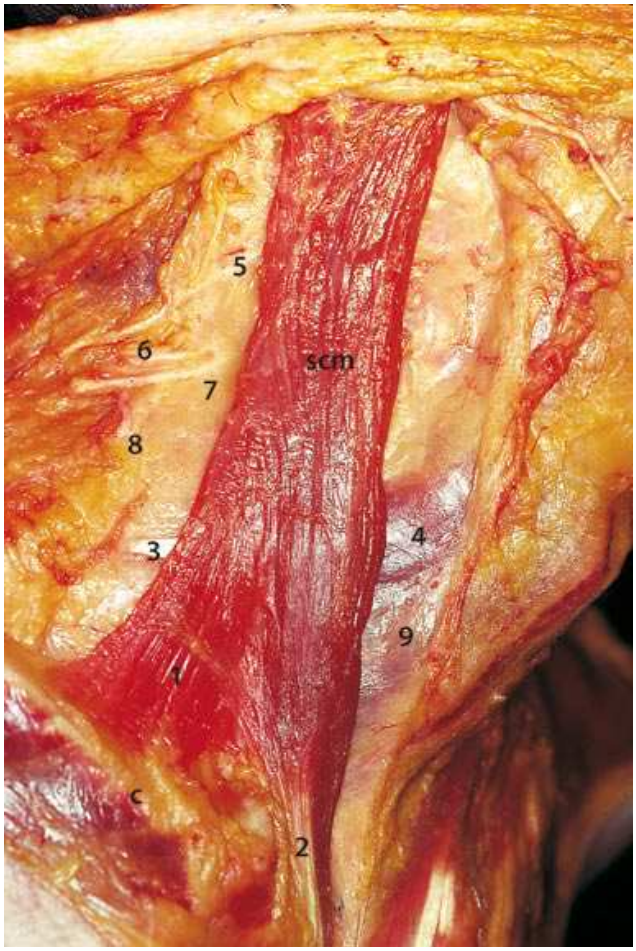
The neck is extended and rotated as far as possible in the opposite direction to the operator. If still present, the platysma is now completely resected, leaving the superficialcervical fascia in place.

On the surface of the sternocleidomastoid muscle, under the superficial cervical fascia, three structures can clearly be seen which cross the muscle:

(1) thegreat auricular nerve, (2) the external jugular vein with its branches, and (3) the cutaneous cervical nerve; both nerves are cutaneous (sensory) branches of the cervical plexus.

The superficial cervical fascia is dissected along the external surface of the sternocleidomastoid muscle, in the center, following a craniocaudal direction, and so the abovementioned structures are interrupted. The fascia is raised from the muscle fibers by holding the scalpel at a tangent to the muscle along its entire length (Fig. 6.3).

The dissection of level V begins with the identification and isolation of the spinal accessory nerve.




**Sternocleidomastoid muscle**

scm = sternocleidomastoid muscle

c = clavicle

1 = clavicular head of sternocleidomastoid muscle

2 = sternal head of sternocleidomastoid muscle

3 = intermediate omohyoid tendon

4 = superior belly of omohyoid muscle

5 = great auricular nerve (dissected)

6 = other branches of cervical plexus

7 = cutaneous cervical nerve (dissected)

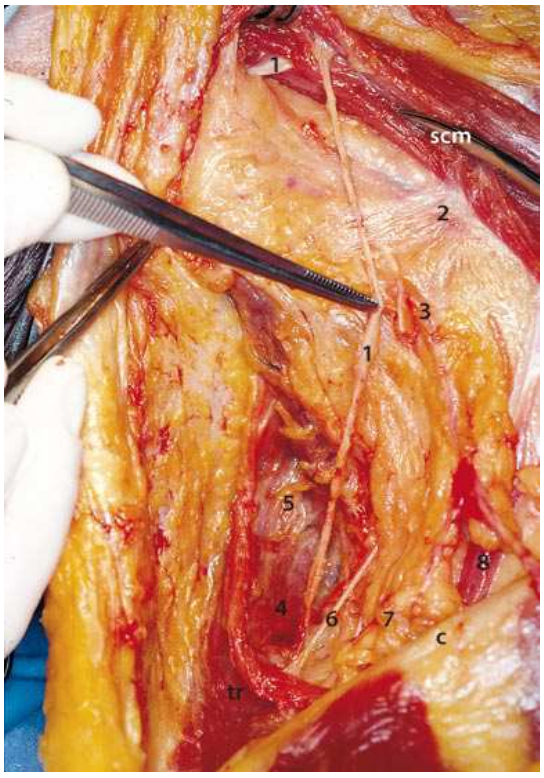
8 = spinal accessory nerve (peripheral branch)

9 = sternohyoid muscle

The accessory nerve originates in the cranium from the union of the vagal accessory nerve (parasympathetic fibers/visceral effector) and spinal accessory nerve (somatic motor); it exits from the posterior foramen lacerum and divides once again – the vagal portion (internal or medial branch) joins the vagus nerve and participates in innervating the larynx.

The spinal portion (external or lateral branch) passes anteriorly to the internal jugular vein, enters the sternocleidomastoid muscle (which it innervates), and exits in proximity to the posterior margin of the muscle.

Running from top to bottom and from front to rear, the peripheral portion of the nerve then enters the trapezius, which it innervates.




Spinal accessory nerve
scm = sternocleidomastoid muscle
tr = trapezius muscle
c = clavicle
1 = spinal accessory nerve
2 = superficial cervical fascia
3 = branches of cervical plexus
4 = levator scapulae muscle
5 = deep cervical fascia
6 = cervical nerve serving trapezius muscle
7 = transverse cervical artery
8 =inferior belly of omohyoid muscle

The following structures are sought and isolated below the spinal accessory nerve (level VB):

1. The distal portion of the transverse cervical artery.
2. The cervical plexus branch serving the trapezius. These structures are exposed by medially lifting the loose connective tissue from the supraclavicular fossa with the scissors

The omohyoid muscle is identified in the superficial portion of the supraclavicular triangle. The external jugular vein is evident in the immediate subfascial plane, thus abovethe plane of the omohyoid muscle.

It arises from the external surface of the sternocleidomastoid muscle, lateralizes and descends toward the clavicle, and then meets the subclavianvein. It is served laterally by a single significant venous branch, i.e., the transverse cervical vein. These vessels are isolated and dissected at their ends.

The next step is to isolate the inferior belly of the omohyoid muscle, which is invested in the more lateral portion of the mid–cervical fascia divided into two .

We section the omohyoid muscle distally and evert it. Any hypertrophic lymph nodes of the supraclavicular chain lying on the posterosuperior margin of the clavicle are identified. With the aid of dry

gauze, the adipose tissue is lifted medially, thus revealing the deep plane where we identify the plane of the scalene muscles, the brachial plexus and the overlying transverse cervical artery.

There are three scalene muscles: theanterior, medial, and posterior. They descend from the cervical column, diverging laterally, and inserting in the first and second ribs. They are invested by the deep cervical fascia, which continues medially on the prevertebral muscles

The brachial plexus is formed by the anterior branches of the fifth through eighth cervical nerves and of the first thoracic nerve.

Three primary nerve trunks exit between the anterior scalene muscle and the medianscalene muscle. One branch of the brachial plexus, the dorsal scapular nerve, exits between the median scalene and the posterior scalene muscles. The brachial plexus innervates the upper limb.

**Remarks:**

Pancoast syndrome is the painful symptom complex propagated to the arm due to compression of the brachial plexus by laterocervical metastasis or a primary tumor of the apex of the lung.

**Complications:**

In neck surgery, particularly neck dissection, lesions of the brachial plexus are very rare. The plexus is readily identifiable as a white, fibrous, triangularshaped cord with an inferior base, forming the space between the scalene muscles. The plexusand muscles are invested by the deep cervical fascia

It is generally easyto elevate the supraclavicular cellulo–adipose tissue from the scalene plane with gauze since the surface of the deep cervical fascia is an excellent cleavage plane. Since the superior primary nerve trunk (C5–C6) is in a more superficial position than are the medial and inferior trunks, it is more exposed to trauma or lesions. Anatomic variants are also possible: In the loose supraclavicular cellular tissue, I personally witnessed the C5–C6 trunk running superficially and consequently, accidentally sectioned. This iatrogenic lesion induces motor impairment in the shoulder, which becomes lowered, with frequent dislocation of the head of the humerus; the arm droops on the trunk, exhibiting internal rotation and pronation.

There is abduction paralysis of the arm and flexion paralysis of the forearm; 2 to 3 weeks later, atrophy appears in the muscles concerned.
The transverse cervical artery (and vein) (or superficial cervical artery) and transverse scapular artery (and vein) (or suprascapular artery)

originate from the thyrocervicaltrunk. They enter the region mediallyand diverge laterally, crossing at two differentlevels of the brachial plexus.

They must be isolatedand their course followed to the region boundaries.

The phrenic nerve is a ramus muscularis of the four of the cervical plexus. It induces movement of the diaphragm, and contains sensory fibers for the pulmonary pleura and pericardium.

It rests on the surface of the anterior scalene muscle, taking a slightly diverging lateromedial course with respectto the brachial plexus (as a memory aid, the phrenic nerve can be thought of as the thumb of a hand, while the other four fingers represent the branches of the brachial plexus).

The phrenic nerve can be easily identified by continuing digital elevation medially along the cleavage plane formed by the deep cervical prescalene fascia.

It appears medially to the brachial plexus, invested by fascia on the external surface of the anterior scalene muscle. Dissection of the cutaneous branches of the cervical plexus, with the scissor point craniad, must be performed on a more superficial plane to the course of the phrenic nerve, which must always be identified beforehand.

**Complications:**

Injury to or dissection of a phrenicnerve presents as paralysis of a hemidiaphragm and its elevation. Patients with monolateral phrenoplegia are generally asymptomatic; however, they may complain of dyspnea when lying down, since the contents of the abdomen tend to raise the flaccid hemidiaphragm.

The resulting compensatory expansion of the rib cage forces the intercostal and accessory muscles to work hard to produce an effective inspiratory volume. Spirometry in patients with monolateral phrenoplegia exhibits a 25% decrease in total lung capacity (TLC), vital capacity(VC), inspiratory capacity and maximum inspiratory pressure (MIP), while the reduction in forced expiratory volume at the first second (FEVI) may be as high as 40%.

These values are not normally associated with important clinical consequences, except in the presence of previous pulmonary pathologies with reduced respiratory functioning.

Bilateral phrenoplegia, which is very rare in cervical surgery, is more commonly related to central or systemic neurological pathologies. Transitory bilateral paralysis may in some cases result from heart surgery–related hypothermia. Assisted ventilation is required in such cases.

Reparatory operations, requiring optimum physical performance, may also be conducted in patients with monolateral phrenoplegia, and consist of “folding” the flaccid hemidiaphragm to reduce compliance.

To conclude dissection of this region, it may be worth seeking and isolating the subclavian artery. It lies immediately inferomedially to the brachial plexus in the tract where the artery, straddling the first rib beneath the scalene muscles and, passing below the clavicle, becomes the axillary artery. Its passage on the first rib occurs immediately laterally to Lisfranc’s tubercle, which is a bony prominence where the anterior scalene muscle is attached.

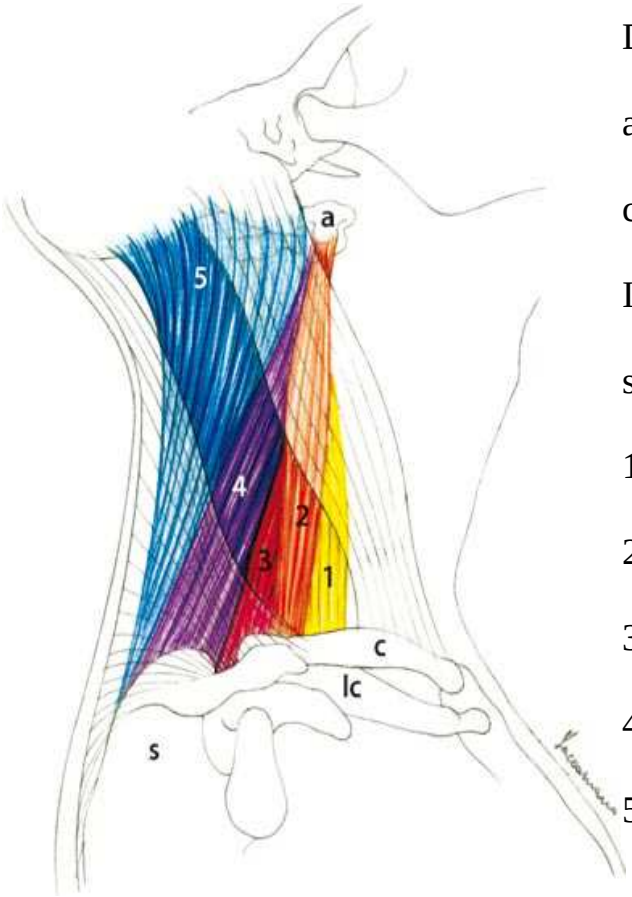
This is an excellent landmark for ligating the interscalene portion of the subclavian artery. To reveal it, it is advisable to dissect the lateral portion of the anterior scalene muscle, of course after having identified and preserved the phrenic nerve.

**Subclavian Artery**

We identify the attachment of the anterior scalene muscle on the first rib and seek Lisfranc’s tubercle by palpation. We look for the artery at the superior margin of the first rib, under the emergence of the brachial plexus. We can reveal it better by dissecting the lateral portion of the anterior scalene muscle, always after having revealed and preserved the phrenic nerve.

**Remarks**:

At this point we recall the rare anterior scalene muscle syndrome, which consists of ischemic disturbances of the upper limb and of the hand and of ulnar neuralgia; these disturbances are accentuated with the limb hanging down and are alleviated when it is raised; they are due to compression of the subclavian artery and of the brachial plexus in the fissure between the median and anterior scalene muscles. The disturbances are cured by sectioning the anterior scalene muscle.




Deep cervical muscles

a = transverse process of atlas

c = clavicle

Ic = first rib

s = scapula

1 = anterior scalene muscle

2 = medial scalene muscle

3 = posterior scalene muscle

4 = levator scapulae muscle

5 = splenius capitis muscle

Anterior Region (Robbins Level VI – Inferior Part)

It coincides approximately with Robbins level VI, and has as its upper limit the hyoid bone and lower limit the medial end of the clavicles, the acromioclavicular articulation, and the jugular incisure of the manubrium sterni.

Laterally it extends from the anterior margin of one sternocleidomastoid muscle to that of the contralateral muscle. Robbins's classification specifies superficial lateral limits, which are the lateral margins of the sternocleidomastoid muscles, and the deep limits, which are the common carotid arteries.

The lymph node stations of this compartment include the prelaryngeal lymph node (Delphian lymph node), the pretracheal lymph nodes, and the recurrent lymph nodes.

In order to balance out the topic more evenly for teaching purposes, in our dissection we have divided the median region into an *inferior part*, corresponding to the trachea, esophagus, and thyroid gland, and a *superior part*, corresponding to the larynx and hypopharynx (Fig. 8.1).

**Significant anatomical structures**:

1) anteriorjugular veins,

2) infrahyoid muscles,

3) thyroid gland,parathyroid glands, inferior thyroid artery,

4) recurrent nerve, trachea, cervical esophagus,

brachiocephalicartery (or innominate artery), vagus nerve,

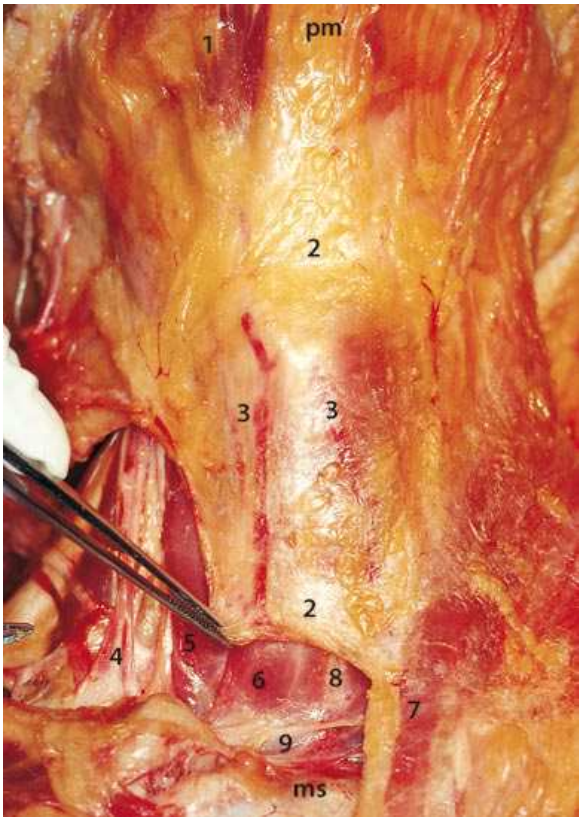
subclavian artery, thyrocervical trunk, vertebral artery.

**Landmarks**:

jugulum, infrahyoid white line, carotid tubercle, cricothyroid articulation.

First, we identify the main landmarks of this region, that is, the body of the hyoid bone and its greater cornua, the laryngeal prominence, the cricoid ring, and the intercricothyroid space, and finally, the jugulum

Dissection begins lateromedially by elevating the superficial and middle fasciae of the infrahyoid muscle plane




**Superficial fascial plane.**

pm = mental prominence

ms = manubrium sterni

1 = platysma muscle

2 = superficial cervical fascia

3 = anterior giugular vein

4 = internal jugular vein

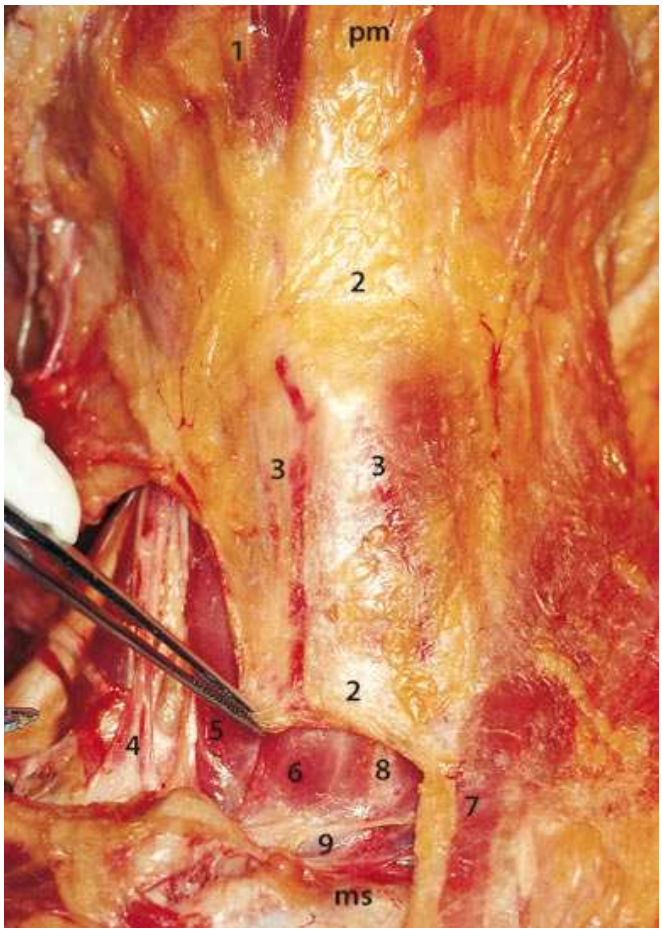
5 = sternothyroid muscle

6 = sternohyoid muscle

7 = sternocleidomastoid muscle (sternal head)

8 = infrahyoid white line

9 = Gruber's recess




**Boundaries of the anterior region**

m = mandible

i = hyoid bone

c = clavicle

s = sternum

1 = anterior belly of digastric muscle

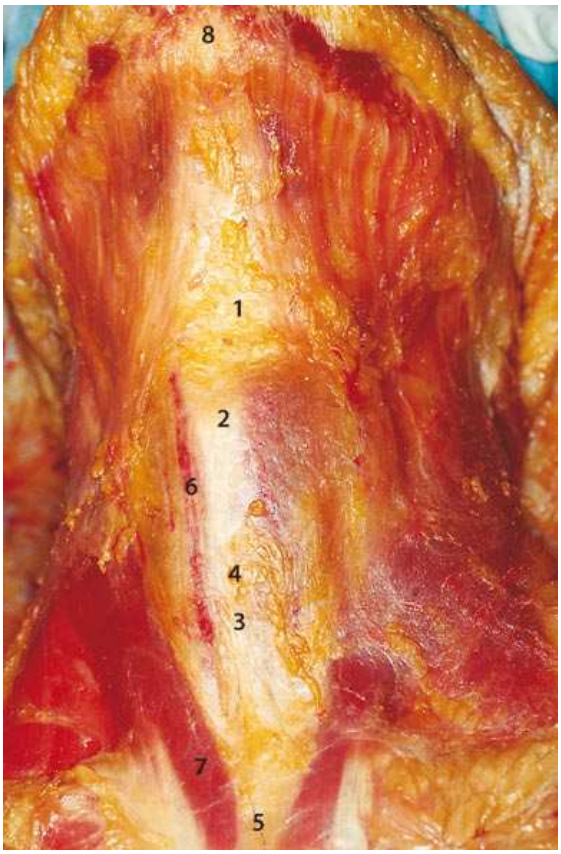
2 = thyrohyoid muscle

3 = omohyoid muscle

4 = sternohyoid muscle

5 = sternocleidomastoid muscle (clavicular head)

6 = sternocleidomastoid muscle (sternal head)

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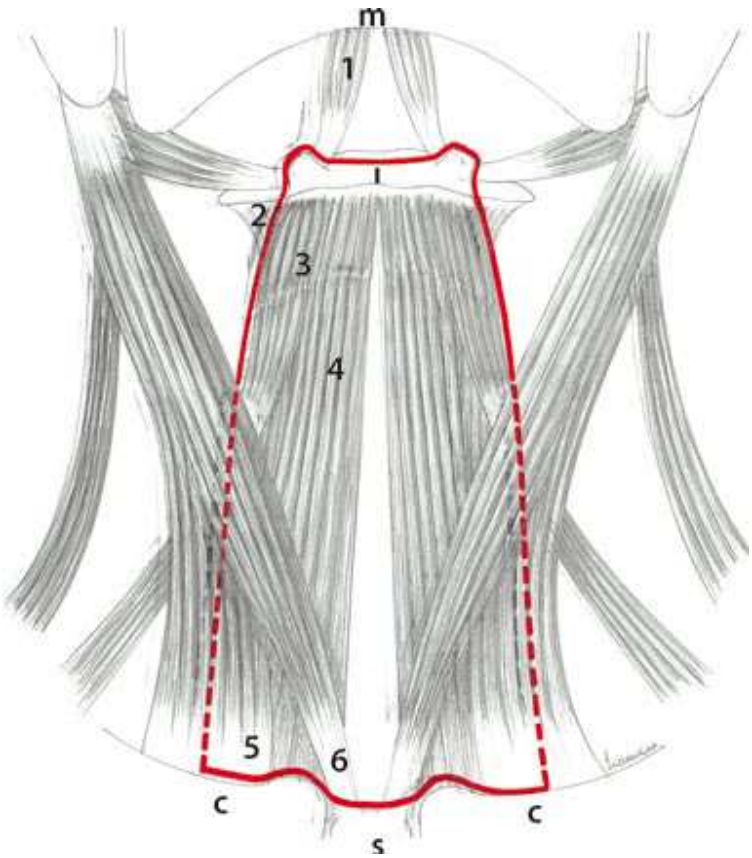



**Anterior region: orientation**

1 = body of hyoid bone

2 = laryngeal prominence

3 = cricoid ring

4 = intercricothyroid space

5 = jugular notch

6 = anterior jugular vein

7 = sternocleidomastoid muscle (sternal head)

Below are some important data on the superficial fascial plane:

1. The medial margin of the platysma takesa divergent downward course and is consequentlynot present in the medioinferior part of the region.
2. The superficial and middle cervical fasciae fuse on the midline into a single aponeurosis, a sort of raphe extending from the hyoid bone to the sternum, which is referred to as the infrahyoid white line.
3. The superficial vessels are negligible, except for the anterior jugular veins, which run vertically to the neck along the paramedian line.

   At approximately 2 cm from the sternum they bend laterally and become embedded, passing posteriorly to the sternal tendon of the sternocleidomastoid muscle and empty into the brachiocephalic veins.
4. A few centimeters superior to the sternum, the cervical fascia divides into two sheets, one directed to the anterior and the other to the posterior border of the manubrium sterni.

They delimit a space called the suprasternal space (Gruber's recess)-it contains cellulo–adipose tissue with a few lymph nodes and an anastomosis joining the anterior jugular veins that cross it.

Fascia resection extends superiorly to the hyoid bone, thereby exposing the muscle plane formed by the omohyoid, sternohyoid, and thyrohyoid muscles.

We can see that the middle cervical fascia extends laterally from one omohyoid muscleto the other, and that the sternothyroid muscle laterally overlaps more than the overlying sternohyoid muscle.

The infrahyoid muscles are then sectioned at the sternoclavicular level and raised from the thyroid gland, and cricoid and thyroid cartilages by applying cranial traction.

The sternohyoid muscles are elevated up to the hyoid bone and the sternothyroid muscles up to the line of attachment to the thyroid lamina.

The innervation of these muscles derives from the ansa cervicalis, with the exception of the thyroid muscle, which is directly innervated by a branch of the hypoglossal nerve.

At the end of this maneuver, the thyroid gland is well revealed . The next step is to examine and dissect the thyroid gland and parathyroid glands. The thyroid is an endocrine gland lying medially to the base of the neck, whose front view has an open H shape and on cross-section a horseshoe shape, enclosing the cervical trachea in its concavity and the larynx and esophagus laterally. It is invested by a slender, fibrous perithyroid sheath, which proceedslaterally along the pedicles and attaches to the cervical vasculonervous bundle. This covering is part of

the vascular sheath and is independent of the superficial and middle cervical fasciae. Lying below the sheath is the thyroid capsule, which is an integral part of the parenchyma enclosing the gland's superficial vessels.

As in clinical practice, the gland is dissected after identifying and ligating the superior vascular pedicles. The superior thyroid artery (and vein), an upper branch of the external carotid artery, initially runs horizontally, parallel to the greater cornu of the hyoid bone, then descends toward the homolateral thyroid lobe; medially it gives rise to the superior laryngeal artery and then divides into threebranches: one medial, which is the largestand runs along the superior thyroid margin, one posterior and one lateral, from which the cricothyroid artery arises and takes a medial course, perforating the homonymous membrane.

**Complications:**

In thyroid surgery, the superior thyroid pedicle must be ligated downstream from the laryngeal artery origin and, above all, should not involve the external branch of the superior laryngeal nerve. Once the upper pedicle has been ligated, we must avoid proceeding downward with the elevation of the thyroid from the larynx, because we would arrive immediately near the recurrent nerve just where it enters the larynx.

Near the isthmus of the thyroid gland, the pyramidal lobe (Lalouette's lobe) is then identified. It consists of an ascending process of the thyroid parenchyma. It has the following characteristics. It saddles the thyroid cartilage of the larynx, generally in a left paramedian position; it is present three times out of four; it extends upward like a more or less evident fibrous cord passing just posteriorly to the corpus ossis hyoidei; and ascends toward the foramen cecum linguae. Lalouette's lobe is the embryonic remnant of the thyroglossal duct that shows the descent of the thyroid gland from its embryonic anlage situated in the corpus linguae at the base of the neck.

**Remarks:**

Cysts and median fistulae of the neck develop along the path of the thyroglossal duct, like "aberrant" thyroids or accessory thyroids. Their removal requires the complete exeresis of these structures and, to avoid recurrences, of the median portion of the hyoid bone with which the thyroglossal duct establishes close relations.

Before beginning to look for the recurrent nerves, we free the anterior surface of the trachea.

The thyroid gland/cervical trachea complex needs to be stretched as far as possible cranially in order to expose an extensive tract of the trachea.

The subthyroid pretracheal space is occupied by the so-called thyropericardial lamina, which is sectioned to expose the anterior trachea wall.

We section the tissue that is on a more superficial plane than the anteriorsurface of the trachea, that is, we avoid goingany deeper laterally because, in doing so, we would risk encountering the recurrent nerves.

The middle cervical fascia is attached superiorly to the hyoid bone and laterally to the omohyoid muscles. Inferiorly, it adheres to the osteofibrous contour of the superior opening of the thoracic cavity (sternum, clavicle, and upper ribs). Inferiorly, the fascia continues downward with more or less consistent thickness associated with the large vessels of the mediastinum and pericardial serosa.

This median fascial structure takes the name of thyropericardial lamina and encloses the following: the arteria thyroidea ima, which arises directly from the innominate artery or aortic arch (with inconsistent presence and caliber), and the pretracheal lymph nodes.

On exposure, proceeding craniocaudally, the trachea can be seen increasingly embedding below the cutaneous plane.

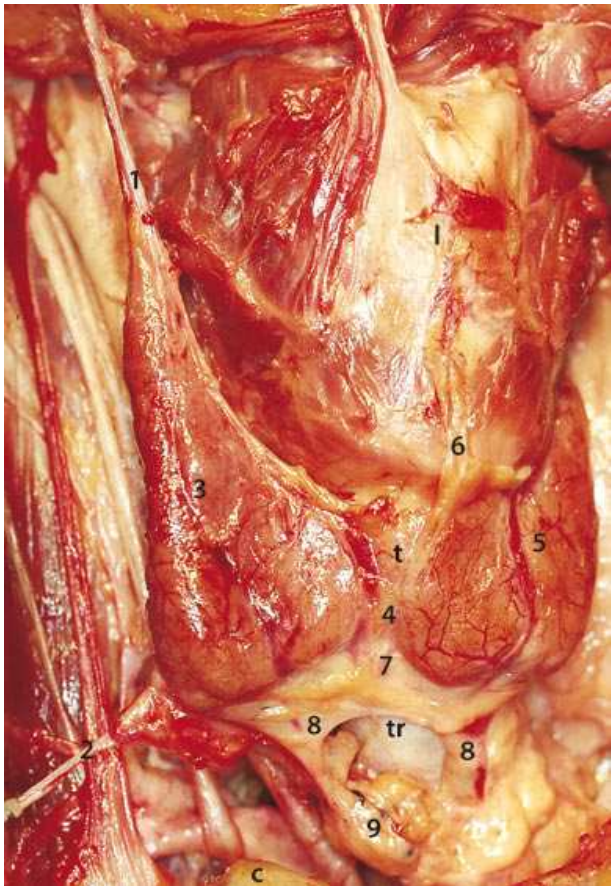
**Complications:**

Perfect familiarity with this anatomic site is essential to ensure a risk free subthyroid tracheotomy. In some cases the inferior thyroid nerves may be rather large and numerous. The accidental interruption and

downward loss of a sectioned inferior thyroid vein, which naturally tends to retract into the mediastinic adipose tissue and to bleed, may become a serious problem.

At this point we can turn our attention to the recurrent nerves. The inferior laryngeal nerve, or recurrent nerve, originates in the first intrathoracic tract of the vagus nerve: it arises more cranially to the right than to the left, and immediately encloses the subclavian artery anteroposteriorly and inferosuperiorly.

To the left it takes a similar course, enclosing the aortic arch. The recurrent nerves reascend, running through the dihedral angle between trachea and esophagus, with slight asymmetry in so far as the esophagus protrudes further to the left than does the trachea. In this tract, it gives rise to numerous collateral branches (middle cardiac branches serving the cardiac plexus, pharyngeal branches serving the pharyngeal plexus, in addition to tracheal and esophageal branches). It penetrates the larynx behind the articulation between the inferior cornu of the thyroid cartilage and the cricoid ring. The recurrent nerve is a mixed nerve. It innervates all intrinsic laryngeal muscles, except for the cricothyroid muscle, which is innervated by the superior laryngeal nerve; sensory fibers innervate the mucosa of the inferior aspect of the vocal folds, the hypoglossal region, and the upper tracheal rings




**Thyroid (II)**

l = larynx

t = thyroid gland

tr = trachea

c = clavicle

1 = superior thyroid artery

2 = inferior thyroid artery

3 = right thyroid lobe

4 = isthmus of the thyroid gland

5 = left thyroid lobe

6 = pyramidal thyroid lobe (Lalouette’s lobe)

7 = ima thyroid artery

8 = inferior thyroid artery

9 = pretracheal lymph nodes

**Complications:**

Thyroid and tracheal surgery present the surgeon with the risk of recurrent nerve injury. Such lesions are generally manifested by vocal fold fixity in a paramedian or intermediate position. If the lesion is not bilateral (in which case tracheotomy is often required, with subsequent surgery to extend the glottis), the main symptom is dysphonia owing to incomplete glottal closure. When the lesion is incomplete, because, for example, the nerve has been excessively stretched, the paralysis may regress spontaneously. Where, instead, paralysis persists, the voice may spontaneously improve through compensation by the healthy voice fold, which exceeds the midline during phonation. This compensatory mechanism, which develops over a period of months, is helped by speech rehabilitation. First, we look for the inferior thyroid artery. It arises from the thyrocervical trunk and enters the recurrent region, passing posteriorly to the common carotid artery. Its relations with the recurrent nerve are important for the surgeon who, on ligating the inferior thyroid pedicle during thyroidectomy, should be careful not to impair the nerve. Unfortunately, relations between the two structures are variable—the artery is often already divided when it crosses the nerve, which may run between its branches. The right recurrent nerve more commonly runs anteriorly to the artery and the left one posteriorly. In routine surgical

practice, ligation of the inferior thyroid pedicle should only be performed after definitely identifying and isolating the homolateral recurrent nerve.

In vivo the inferior thyroid artery must be ligated with particular attention. It is a vessel of considerable caliber, and if its ligature comes undone, considerable difficulties may arise in recovering the interrupted and bleeding vessel. It is useful to remember that it enters our field of operation, by passing posteriorly to the common carotid artery; this knowledge should avoid serious trouble in surgical movements that in these cases are often agitated.

**Recurrent Nerve**

The search for and isolation of the inferior laryngeal nerve (recurrent nerve) is the focal point of this dissection exercise. To be successful, we must prepare the field of operation precisely.

First, we must apply traction medially on the thyroid lobe and identify, farther down, the hypopharynx and the cervical esophagus. Laterally we seek the common carotid artery, which is lateralized with a Farabeuf. Deepdown, by palpation, we can identify the prevertebral plane.

We then seek tangentially in the triangle between the trachea (medially), the common carotid artery (laterally), and the inferior thyroid

artery (superiorly) (whose name is Lore’s triangle). This is the recurrent region in which the recurrent nerve and inferior thyroid artery are found, embedded in the celluloadipose connective tissue and crossing each other atright angles.

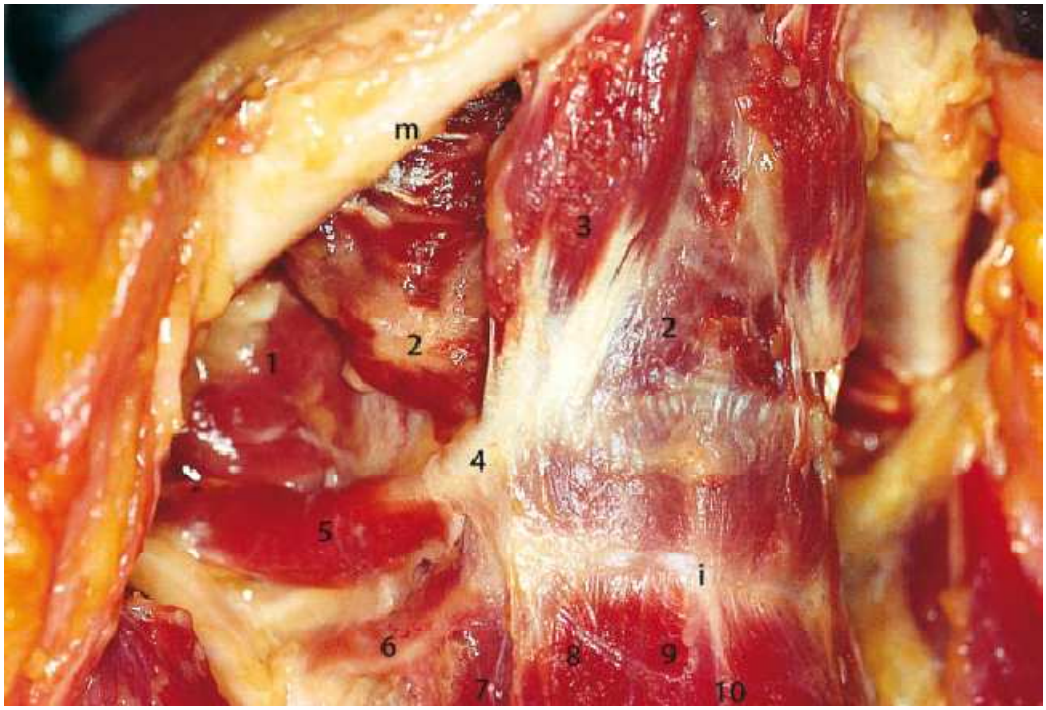
To seek the nerve we divaricate the adipose tissue with scissors in the dihedral angle between the esophagus and the trachea, proceeding craniocaudally.

Once it has been found it must be isolated and followed until it enters the larynx, posterior to the cricothyroid articulation. In this region, we can also find some lymph nodes of the recurrent chain, which form the lymphatic drainage of the thyroid gland, of the hypoglossal region, and of the cervical trachea. Last, we shall try to identify the parathyroid glands.

**Complications:**

If it is difficult to identify the right recurrent nerve, we must also consider the possibility of a “nonrecurrent” recurrent nerve (0.5–1% of cases). That means that, due to a congenital anomaly of the right subclavian artery, the right nerve starts directly from the vagus nerve next to the thyroid gland.

## Anterior Region (Robbins Level VI – Superior Part)




### Hyoid area

m = mandible

i = hyoid bone

1 = hyoglossal muscle

2 = mylohyoid muscle

3 = anterior belly of digastric muscle

4 = intermediate tendon of digastric muscle

5 = posterior belly of digastric muscle

6 = greater cornu of hyoid bone

7 = thyrohyoid muscle

8 = omohyoid muscle

9 = sternohyoid muscle

10 = infrahyoid white line

**Significant anatomical structures:**

infrahyoid muscles, larynx, quadrangular membrane, elastic cone, Reinke's space, anterior commissure, Morgagni's ventricle, cricothyroid artery, hypopharynx, Galen's loop**.**

**Landmarks:**

hyoid bone, intercricothyroid space, foramen cecum linguae. We begin dissection from the top, starting from the hyoid bone, which we identify by palpation to distinguish its parts: the body, the greater cornua and the lesser cornua, the latter being close to the point of insertion of the stylohyoid muscles. The hyoid bone is the only bone that is not joined to the rest of the skeleton; instead, in most vertebrates it is joined through the ossification of that structurewhich, in exceptional cases, is ossified also in humans, that is, the stylohyoid ligament. It is an important point for the support of the larynx during the ample craniocaudal excursions of deglutition (which may be as much as 2 to 3 cm)

We recognize the submental triangle, also referred to as the interdigastric space, which we already drained in a previous exercise and that corresponds to Robbins level IA. The suprahyoid white line, which runs from the mental symphysis to the corpus ossis hyoidei, is formed by fusion of the mylohyoid muscles on the midline

The sternohyoid and sternothyroid muscles already interrupted at the bottomare removed. The thyrohyoid muscles are sectioned at the point of insertion in the thyroid cartilage and hyoid bone and then ablated, thereby exposing the thyrohyoid membrane.

The larynx is thus completely exposed. Posteriorly, the hypopharynx is separated from the prevertebral plane.

The larynx is situated anteriorly to the hypopharynx, superiorly to the trachea, and inferiorly to the base of the tongue and hyoid bone. It is formed by the following structures:

1. A cartilaginous skeleton formed by nine cartilages, three unpaired and six paired, with two articulations (cricothyroid and cricoarytenoid).

2. Two elastic submucous membranes, the quadrangular lamina and the elastic cone. The first extends from the lateral margin of the epiglottis to the anterolateral aspect of the corresponding arytenoid cartilage, supporting the aryepiglottic fold. The second extends from the margin of the vocal fold, where itthickens to form the vocal ligament, to the superior margin of the cricoid cartilage.

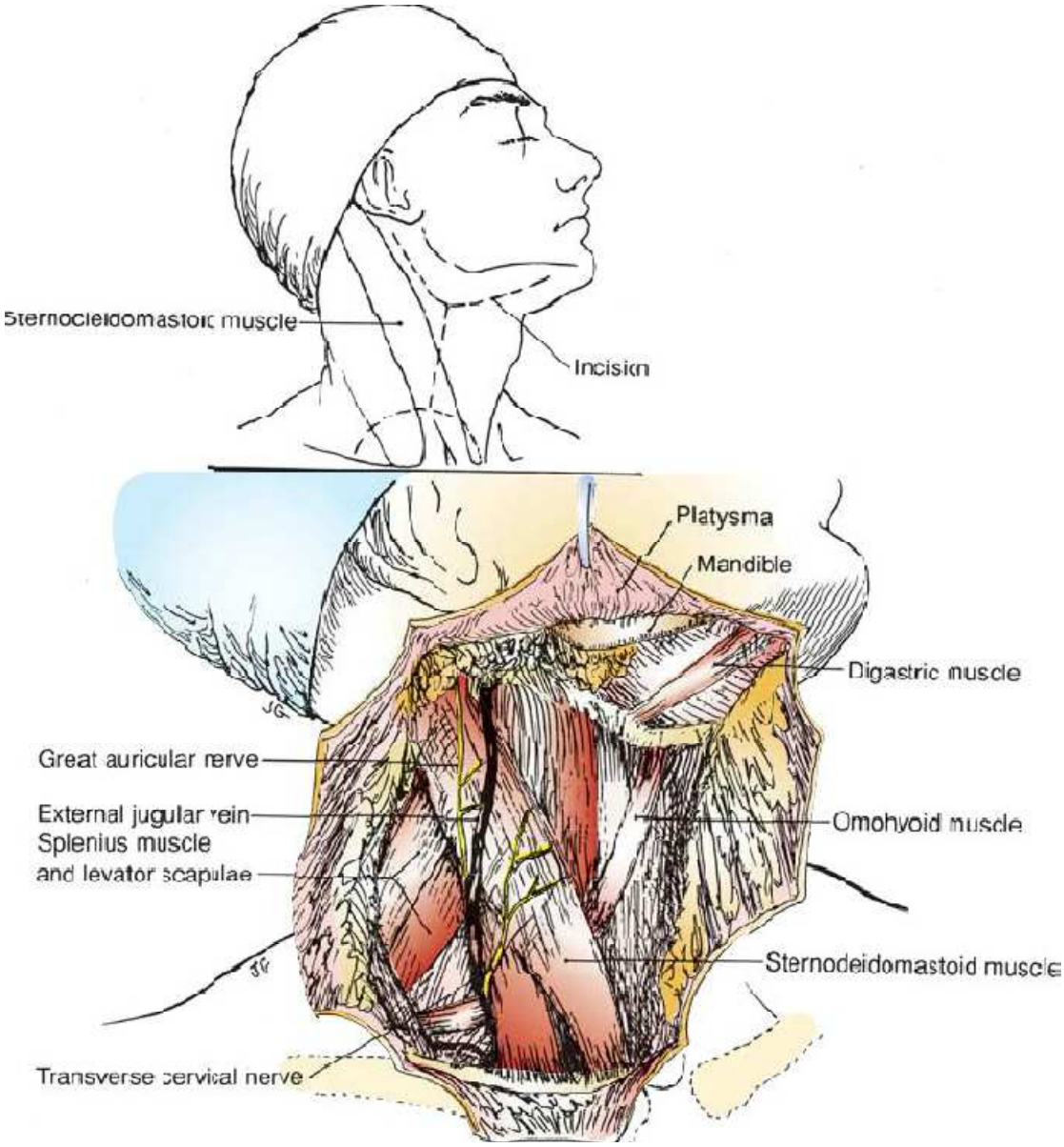
3. Three fibroelastic sheets: the hyoepiglottic membrane, the thyrohyoid membrane, andthe cricothyroid membrane.

4. Intrinsic muscles for moving the mobile parts of the larynx (arytenoid cartilages, vestibular folds, and vocal folds). Adduction

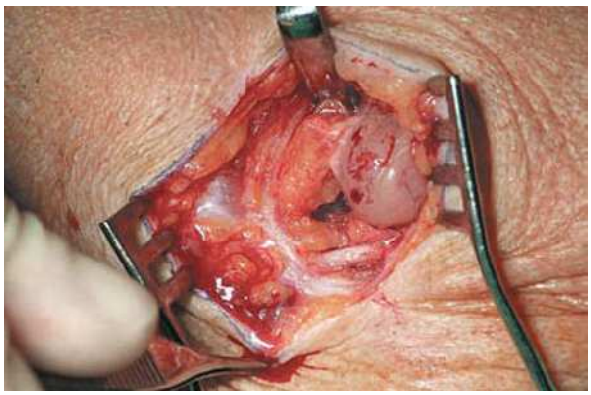
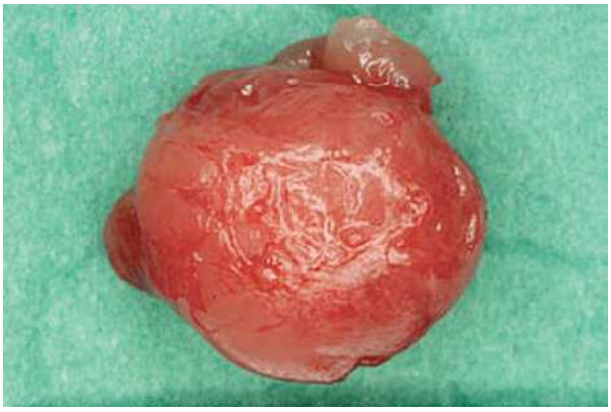
movements are effected by the interarytenoid (transverse and oblique) and lateral cricoarytenoid muscles and abduction movements by the posterior cricoarytenoid muscles; vocal cord tension is provided by the thyroarytenoid and cricothyroid muscles .

5. The larynx is vascularized by the superior laryngeal and cricothyroid branches of the superior thyroid arteries; a minor contribution is made by the inferior laryngeal branches of the inferior thyroid arteries.

# LYMPH NODE DISSECTIONS OF NECK



## STEPS IN PROCEDURE


### Standard or Modified Radical Neck Dissection

Position patient with head turned to contralateral side and elevate head of table slightly

Avoid placing incision in a line directly over carotid artery

Elevate flaps at level just deep to platysma

Identify and ligate facial artery and facial vein

Identify and protect marginal mandibular branch of facial nerve

Begin at inferior margin of field

Ligate and divide external jugular vein

**If standard neck dissection:**

Divide and elevate sternocleidomastoidmuscle (may preserve for modified) ldentify, ligate, and divide internal jugular vein (may preserve for modified) Elevate all surrounding fatty tissues with the divided structures, preserving underlying nerves Terminate dissection at cephalad aspect, including submandibular gland with specimen Meticulous closure, with closed-suction drainsif desired

**Selective Node Dissection**

Generally, small incision-tailored to node group to be removed En bloc selective removal of one or moregroups of lymph nodes Generally surrounding structures are preserved

**Central Node Dissection**

Generally done through a collar (thyroid) incision Elevate subplatysmal flaps. Divide strap muscles in midline

# MATERIALS AND METHODS

# MATERIALS AND METHODS

**SAMPLE SIZE** : 50 cases

**STUDY DESIGN** : Observational study (Prospective And Retrospective)

**STUDY POPULATION** : 50 cases

**STUDY PERIOD** : October 2015 to September 2016

**STUDY CENTRE** : Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai

**SUBJECT SELECTION :**

**INCLUSION CRITERIA :**

All patients presenting with cervical lymphadenopathy with or without other group of lymph nodes in the body

**EXCLUSION CRITERIA:**

All paediatric patients(< 13 years of age)

All oral malignancy patients with associated cervical lymphadenopathy

**ASSESSMENT OF PARAMETERS :**

All Patients who fit the inclusion criteria will be observed and following data collected

1.Details of the patient like

- age
- duration of the swelling
- contact history with tuberculosis patients
- associated complaints

2. Routine blood investigations

-Hemoglobin

- Hematocrit

-Total count and differential count

- Peripheral smear

- Total and direct bilirubin

- Blood urea and serum creatinine

- LDH

3. High frequency ultrasound of the neck

4. FNAC of the swelling

5. Chest x ray, CECT neck in selective cases

6. Mantoux test and sputum AFB

7. Excision biopsy in case of diagnostic dilemma

8. Post operative biopsy report

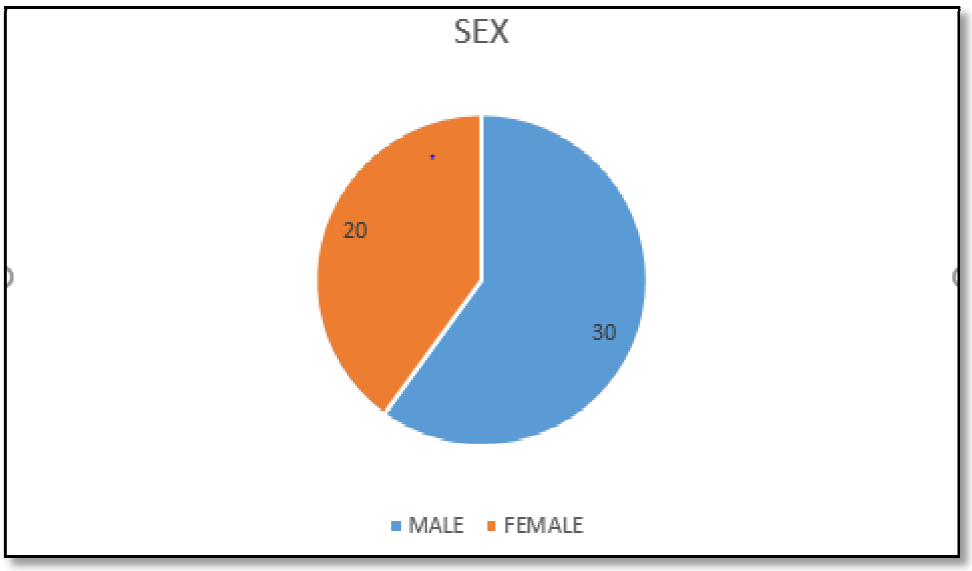
9. The final treatment plan and the follow up of the patients till discharge or during their future visit to RGGGH

10. Conclusions were drawn based on the above parameters

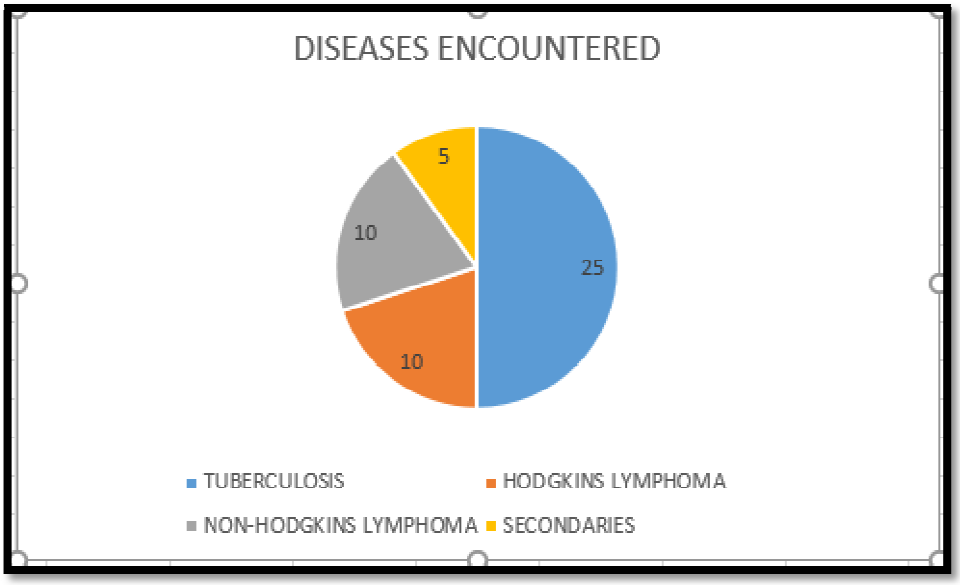
# OBSERVATIONS AND RESULTS

# DATA ANALYSIS AND RESULTS

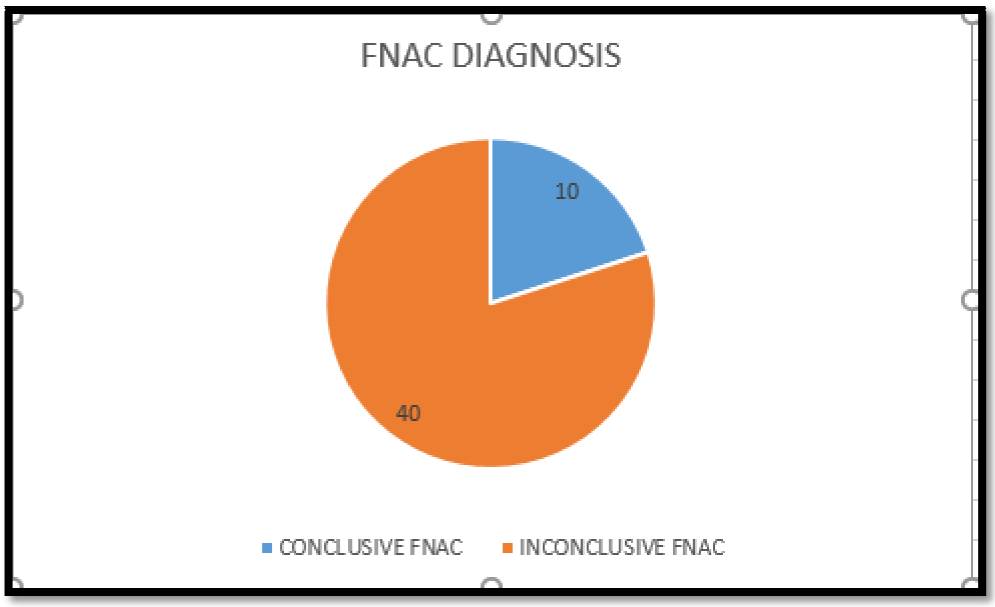
## MALE FEMALE SEX RATIO IN THIS STUDY GROUP



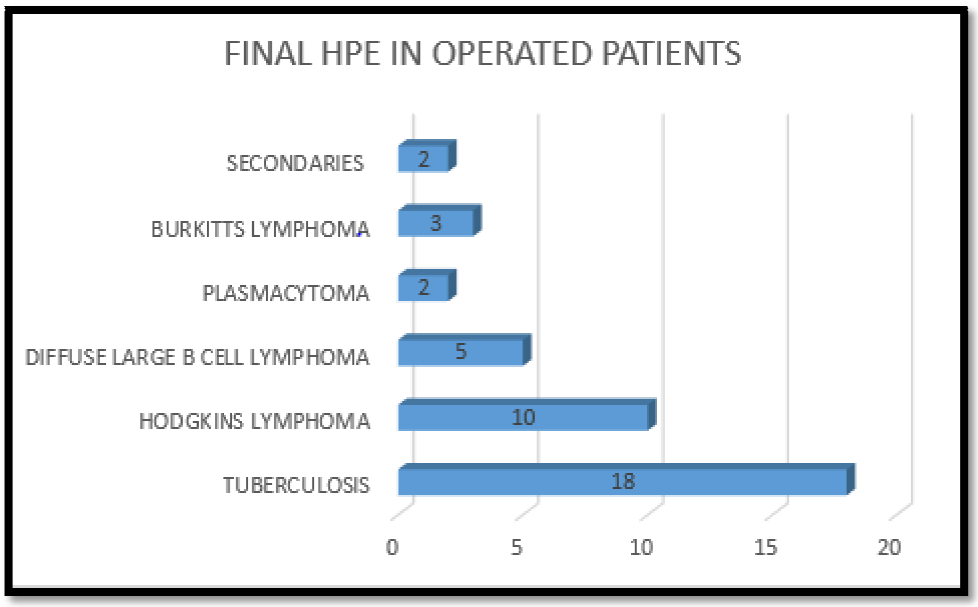
## DISEASES ENCOUNTERED IN THIS STUDY



## FNAC DIAGNOSIS IN THIS STUDY



## HPE REPORTS IN THIS STUDY



# DISCUSSION

# DISCUSSION

This study involving 50 patients was conducted in RGGGH over a time span of 1 year(oct 2015-sep 2016)recording all patients who fit the inclusion criteria .

All patients who fit the inclusion criteria were subjected to

- History taking
- Hemoglobin/ hematocrit/TC/DC/Peripheral smear/LDH
- High frequency ultrasound neck
- FNAC
- Chest X-ray
- CECT neck in selected patients
- Mantoux test/sputum AFB in selected patients

Excision biopsy in inconclusive FNAC report Out of 50 patients

1.FNAC was conclusive in 10 patients

2. Diagnostic dilemma in 40 patients

| FNAC CONCLUSIVE | DIAGNOSTIC DILEMMA |
|---|---|
| 10 | 40 |

Out of 10 patients in whom FNAC was conclusive, 8 had reports suggestive of Tuberculosis ,2 had reports of carcinomatous deposits

| TUBERCULOSIS | SECONDARIES |
|---|---|
| 8 | 2 |

8 patients were subjected to anti tuberculous regimen after Mantoux test and chest X ray without further delay

2 patients were subjected to triple endoscopy and primaries were identified and were managed based on the biopsy of the primary

The remaining 40 patients had inconclusive FNAC

| FNAC report | Number of patients |
|---|---|
| Reactive adenitis | 18 |
| Lympho-proliferative disorder | 14 |
| Repeat sample | 8 |

In the 18 patients with reactive adenitis, with histopathology report and gene x pert studies the final diagnosis was tuberculous lymphadenitis

These patients were subjected to category 1 anti tuberculous regime and follow up of all 18 patients had regression of the tuberculosis symptoms

In the 14 patients suggestive of lympho-proliferative disorder 7 patients had Hodgkin’s lymphoma and another 7 patients had Non -Hodgkin’s lymphoma

| | |
|---|---|
| HODGKINS LYMPHOMA | 7 |
| NON HODGKINS LYMPHOMA | 7 |

Immuno histo-chemistry was done and appropriate chemotherapy was started

These patients on follow up had good resolution of the swelling and till date no recurrence was detected

In the 8 patients where FNAC was inconclusive ,6 patients were diagnosed as lympho- proliferative disorder

| | |
|---|---|
| Hodgkins lymphoma | 3 |
| Non- Hodgkins lymphoma | 3 |

All were subjected to chemotherapy after doing IHC marker study

2 patients HPE came as secondaries neck and these patients were evaluated further and no primary was detected

1 patients HPE report came as squamous cell deposits and was subjected to radiotherapy

The second patients HPE report came as adenocarcinoma and was subjected to chemotherapy

Both patients expired after three months

# CONCLUSION

# CONCLUSION

- Thus from the above study it is clear that excision biopsy helps in the identification of tuberculosis with gene expert studies and starting of appropriate chemotherapy drugs which is more sensitive to the bacterium

- In lympho-proliferative disorder it helps in identifying the morphology and has an added advantage of immuno-histochemistry marker study which in turn helps to start the ideal NCCN chemotherapy regimen

- In secondaries neck it helps to find out the morphology of deposits which in turn helps to start chemo-radiotherapy

- Thus excision biopsy's role in cervical lymphadenopathy patients is far and wide

- The next modality of choice when FNAC is inconclusive will always be excision

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# ANNEXURES

# PROFORMA

## PATIENT DETAILS:

Name: Age: Sex:

IP No. :

## ON ADMISSION:

MAIN COMPLAINTS:

COMORBIDITIES:

ALCOHOLIC/SMOKER:

CONTACT HISTORY WITH TB PATIENTS:

ASSOCIATED COMPLAINTS :

## CLINICAL EXAMINATION:

Pulse : BP :

RR : Temp :

Pallor : Icterus :

CVS : RS :

P/A : CNS:

LOCAL EXAMINATION OF THE NECK:

EXAMINATION OF AXILLA AND INGUINAL REGION:

**INVESTIGATIONS :**

| CBC/RFT | | | | |
|---|---|---|---|---|
| TC | | | | |
| DC | | | | |
| Hb % | | | | |
| PCV | | | | |
| RBC | | | | |
| Platelets | | | | |
| Glucose | | | | |
| Urea | | | | |
| Creatinine | | | | |
| $Na^+/K^+$ | | | | |

| LFT | | | | |
|---|---|---|---|---|
| Total Bili | | | | |
| Dir. Bili | | | | |
| SGOT | | | | |
| SGPT | | | | |
| Total Protein | | | | |
| Sr. Albumin | | | | |

PERIPHERAL SMEAR:

SERUM LDH:

CXR :

HIGH FREQUENCY USG NECK :

FNAC:

CECT NECK IN SELECTIVE CASES :

MANTOUX TEST AND SPUTUM AFB:

**TREATMENT**

OPERATIVE MANAGEMENT :

Indication :

Intra Op findings :

Post op Biopsy report :

**FOLLOW UP :**

# INFORMATION SHEET

TITLE :"A STUDY ON THE ROLE OF EXCISION BIOPSY IN CERVICAL LYMPHADENOPATHY PATIENTS IN RGGGH"

Name of Investigator : Dr.M.KARTHIK. Name of Participant :

**Purpose of Research :**To study the role of excision biopsy to arrive at a histopathological diagnosis and to start the appropriate treatment.

**Study Design :**Prospective and Retrospective Observational Study

**Study Procedures :** Patient will be subjected to routine investigations with detailed history taking, complete hemogram, USG, FNAC, Operative Procedure as indicated and the data analysed.

**Possible Risks :**No risks to the patient

**Possible benefits**

**To patient :** A better understanding of their problem so has to devise a plan of management which suits their needs.

**To doctor & to other people :** If this study gives positive results, it can help determine the early identification, most effective diagnostic and treatment protocol for patients with cervical lymphadenopathy. This will help in providing better and complete treatment to other patients in future.

**Confidentiality of the information obtained from you :**The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared

**Can you decide to stop participating in the study :**Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time

**How will your decision to not participate in the study affect you :**Your decision will not result in any loss of benefits to which you are otherwise entitled.

Signature of Investigator Signature of Participant

Date :
Place :

# PATIENT CONSENT FORM

Study Detail : ***"A STUDY ON THE ROLE OF EXCISION BIOPSY IN CERVICAL LYMPADENOPATHY PATIENTS IN RGGGH"***

Study Centre : Rajiv Gandhi Government General Hospital, Chennai.

Patient's Name :

Patient's Age :

Patient may check (☑) these boxes

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask question and all my questions and doubts have been answered to my complete satisfaction. ❑

I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving reason, without my legal rights being affected. ❑

I understand that sponsor of the clinical study, others working on the sponsor's behalf, the Ethics committee and the regulatory authorities will not need my permission to look at my health records, both in respect of current study and any further research that may be conducted in relation to it, even if I withdraw from the study I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from this study. ❑

I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperate with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or well being or any unexpected or unusual symptoms. ❑

I hereby consent to participate in this study ❑

I hereby give permission to undergo complete clinical examination and diagnostic tests including hematological, biochemical, radiological tests and to undergo treatment ❑

Signature/thumb impression

Patient's Name and Address:

Signature of Investigator

Study Investigator's Name:

**Dr.M.KARTHIK,**

# MASTER CHART

# MASTER CHART

| SNO | NAME | AGE | SEX | IPNO | LYMPHADENOPATHY | HPE REPORTS |
|---|---|---|---|---|---|---|
| 1 | SELVAM | 45 | M | 13264 | RIGHT CLN | TB |
| 2 | RAMU | 52 | M | 14456 | LEFT CLN | TB |
| 3 | KUMARAN | 46 | M | 22100 | LEFT CLN | TB |
| 4 | SASIKALA | 28 | F | 16672 | RIGHT CLN | TB |
| 5 | RANIDEVI | 32 | F | 11006 | LEFT CLN | TB |
| 6 | PREMA | 28 | F | 22376 | LEFT CLN | BL |
| 7 | KUPPAN | 55 | M | 21345 | LEFT CLN | HL |
| 8 | RAVI | 30 | M | 12345 | RIGHT CLN | TB |
| 9 | ARUN | 26 | M | 11456 | LEFT CLN | TB |
| 10 | MARY | 28 | F | 34324 | RIGHT CLN | BL |
| 11 | SRINIVASA | 62 | M | 11148 | LEFT SCLN | SECONDARIES |
| 12 | ABDULLA | 48 | M | 44353 | RIGHTCLN | HL |
| 13 | REVATHI | 46 | F | 12378 | LEFT CLN | HL |
| 14 | MANOKARI | 54 | F | 54678 | RIGHT CLN | P |
| 15 | JOSEPH | 32 | M | 62345 | RIGHT CLN | TB |
| 16 | AYYAPAN | 33 | M | 21321 | RIGHT CLN | TB |
| 17 | PALANI | 50 | M | 31456 | LEFT CLN | TB |
| 18 | STELLA | 55 | F | 76767 | RIGHT CLN | HL |
| 19 | ANAND | 46 | M | 82816 | RIGHT CLN | DLBCL |
| 20 | SUDALAI | 74 | M | 22356 | RIGHT SCLN | SECONDARIES |
| 21 | PANEER | 68 | M | 89786 | RIGHT CLN | TB |
| 22 | KUMARI | 28 | F | 91567 | LEFT CLN | P |
| 23 | GOMATHI | 33 | F | 32456 | LEFT CLN | HL |
| 24 | VARUN | 42 | M | 12009 | LEFT CLN | TB |
| 25 | KILLIAMMA | 53 | F | 22157 | RIGHT CLN | DLBCL |
| 26 | KANNAGI | 58 | F | 43214 | LEFT CLN | TB |
| 27 | BHAVANI | 42 | F | 34567 | RIGHT CLN | TB |
| 28 | PAPITHA | 45 | F | 11560 | RIGHT CLN | HL |

| | | | | | | |
|---|---|---|---|---|---|---|
| 29 | INDRADEVI | 43 | F | 23177 | RIGHT CLN | BL |
| 30 | DEVAIYAN | 60 | M | 21056 | RIGHT CLN | HL |
| 31 | BHASAI | 36 | M | 16549 | LEFT CLN | TB |
| 32 | CHELLAMA | 45 | F | 25143 | LEFT CLN | TB |
| 33 | MURUGAN | 43 | M | 29834 | RIGHT CLN | DLBCL |
| 34 | ELUMALAI | 56 | M | 14734 | LEFTCLN | HL |
| 35 | KUNNAM | 43 | F | 27382 | LEFT CLN | TB |
| 36 | SELVI | 45 | F | 14563 | LEFT CLN | HL |
| 37 | MITHRA | 34 | F | 25476 | LEFT CLN | HL |
| 38 | DURGAI | 34 | F | 17693 | RIGHT CLN | TB |
| 39 | KANMANI | 32 | F | 25471 | RIGHT CLN | TB |
| 40 | PRIYA | 25 | F | 29321 | LEFT CLN | TB |
| 41 | SUNDARI | 45 | F | 14732 | RIGHT CLN | DLBCL |
| 42 | CHINNAMA | 56 | F | 24532 | LEFT CLN | HL |
| 43 | MUTHAMA | 67 | F | 17691 | RIGHT CLN | TB |
| 44 | ANANDHI | 32 | F | 22143 | RIGHT CLN | TB |
| 45 | AANDAL | 67 | F | 13273 | LEFT CLN | TB |
| 46 | RAAMAYI | 78 | F | 26542 | RIGHT CLN | TB |
| 47 | KALA | 34 | F | 17541 | LEFT CLN | TB |
| 48 | KARUPPAN | 54 | M | 22876 | RIGHT CLN | DLBCL |
| 49 | PAARI | 42 | M | 10047 | LEFT  CLN | TB |
| 50 | SRIPRIYA | 32 | F | 11774 | LEFT CLN | TB |